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# THE UNIVERSITY OF TORONTO MEDICAL JOURNAL

*(An Undergraduate Publication)*

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This journal is published seven times a year, November to May, by the Medical Society of the University of Toronto, to serve as a medium for student expression and to bring to the student recent articles of scientific interest.

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Number 1

## EDITORIAL

The University of Toronto Medical Journal has now passed successfully its first decade, and with this issue begins its eleventh year. In form, the Journal has altered very little from the original issues, but in content certain changes have from time to time taken place. In 1923 the Journal first made its appearance in a very ambitious form, the standard set being very high. At this time, by far the greater percentage of articles were written by members of the Staff in the Faculty of Medicine, relatively few being submitted by students. As time passed, however, more and more student articles were received until at the present time

over 60% of the material published is the work of undergraduates, this majority being considered sufficient even in a Journal whose primary function is to serve as a medium for student expression.

In recent years it has been felt that the Journal had lost some of its former appeal to the students of the lower years. A glance through the pages of the earlier volumes of the Journal will reveal many articles which were undoubtedly of great interest and value to all years alike. It must be admitted that such a universal appeal is difficult to achieve in a Journal in which the material that forms the 'piece de re-

sistance' is entirely clinical in nature. However, it is our desire this year to include topics of a more general nature, still medical in character, in an endeavour to provide a source of interest for the lower years. This is our plan; may we have the co-operation of the students themselves.

We intend, this year, to revive a custom of former years, lately fallen into disuse, by publishing a series of historical sketches and biographies written by the women students. Miss Jessie Gray, '34, will have charge of this department, and we hope the women students will do their utmost in support. Contributions of this nature should not, however, be confined to the efforts of the women students. All students in all years may find it of value to write articles of this kind and in addition there are many interesting problems in Biology, Anatomy, Physiology, etc., which students in the lower years should attempt to set forth in these pages. The course in Science and Civilization in First year offers a tremendous amount of food for thought which students taking this course may desire to express in the form of articles. Some of the best articles in former issues of the Journal were written by Second and Third year students, and one of these was re-printed in another Medical Journal, in the U.S.A.—an honour indeed.

Another department we wish to resuscitate this year is that in which news and the affairs of the Faculty as a whole were reported. Medical Athletics, and the various Social Functions arranged by the Medical Society come in this category. In this way we hope to make our subscribers more closely acquainted with student activity and with the transactions of the Medical Society.

As a beginning we publish in this issue the recently revised Constitution of the Medical Society.

### CLASS OF '39.

On behalf of the Medical Society and the students of the Faculty of Medicine as a whole we wish to extend a word of greeting to the class of '39, and to hope that they will find their labours in this Temple of Aesculapius as interesting and pleasurable as they have surely anticipated and as those of us who have all but ended our course have realized.

In the attainment of that comprehensive education which is the requisite of the successful practitioner, other Halls, and other fields of activity must be sought, in addition to the Biology Lab. and the Lecture Rooms. Extra-curricular affairs are just as much an essential as any one of the courses laid down in the Calendar. Neither the course in Medicine nor these other activities may be neglected. May we humbly offer this word of advice. The student should concentrate intensively on the prescribed course for a while until he has learned the ropes and gained a footing, then and only then, will he appreciate accurately how much of his time may be spared for the pursuance of other interests. When the student begins to feel at home in his course, he must then turn a considerable amount of his attention to exercise, particularly Inter-Faculty Sports, and also to other University activities, such as Hart House debates, musicales, Hart House committees, etc., as well as to individual pursuits. Here we seem to recall paragraphs of this nature in former years in which the key note has always been that "work comes first and play afterwards"—with various dissertations on the happy medium.

We recommend to the students of the first year, none the less to students of all other years, the reading of the article by Dr. Ryerson in this issue entitled "An Unscheduled Course."

# PATHOGENESIS AND TREATMENT OF ANAEMIA

By WILLIAM MAGNER, M.D., D.P.H., Ireland.

St. Michael's Hospital, Toronto.

## Normal and Abnormal Erythrogenesis.

The popular conception of the origin of the red blood corpuscles is that they are derived from the endothelial cells which line the inter-sinusoidal capillaries of the bone marrow. There is no certain knowledge as to the earliest stages of this evolution, but it is known that the immediate precursor of the mature red cell or erythrocyte is the reticulocyte, a cell which, retaining a remnant of the basophilic cytoplasm which characterizes its forbears shows a blue reticulum when supra-vitally stained with cresyl blue. It is also known that the reticulocyte is developed from a nucleated haemoglobin containing cell which is called the normoblast. It is in tracing the origin of the normoblast and its antecedents that difficulty is encountered, but it is thought to be probable that the normoblast is a maturation of the megaloblast, a larger nucleated cell which contains but little haemoglobin, and that the megaloblast springs directly from the vascular endothelium. (Fig. 1.).

In normal circumstances it is only the fully mature erythrocytes and a small number of reticulocytes that find their way into the circulating blood; the normoblasts and megaloblasts remaining confined to the red bone marrow. The non-reticulated red corpuscles are not only fully mature cells, representing the end stage of a series of developmental changes, but, in spite of the important functions which they subserve, they may be regarded as senile or dying cells. They possess no nucleus, they consume no oxygen, and their duration of life is short, probably not more than thirty days, after which

they become fragmented and are removed from the circulation.

As the span of life of the red cell in the circulation is brief, the marrow must exhibit constant activity in order that the corpuscular content of the blood may be kept up to normal. In health the marrow is working well with-

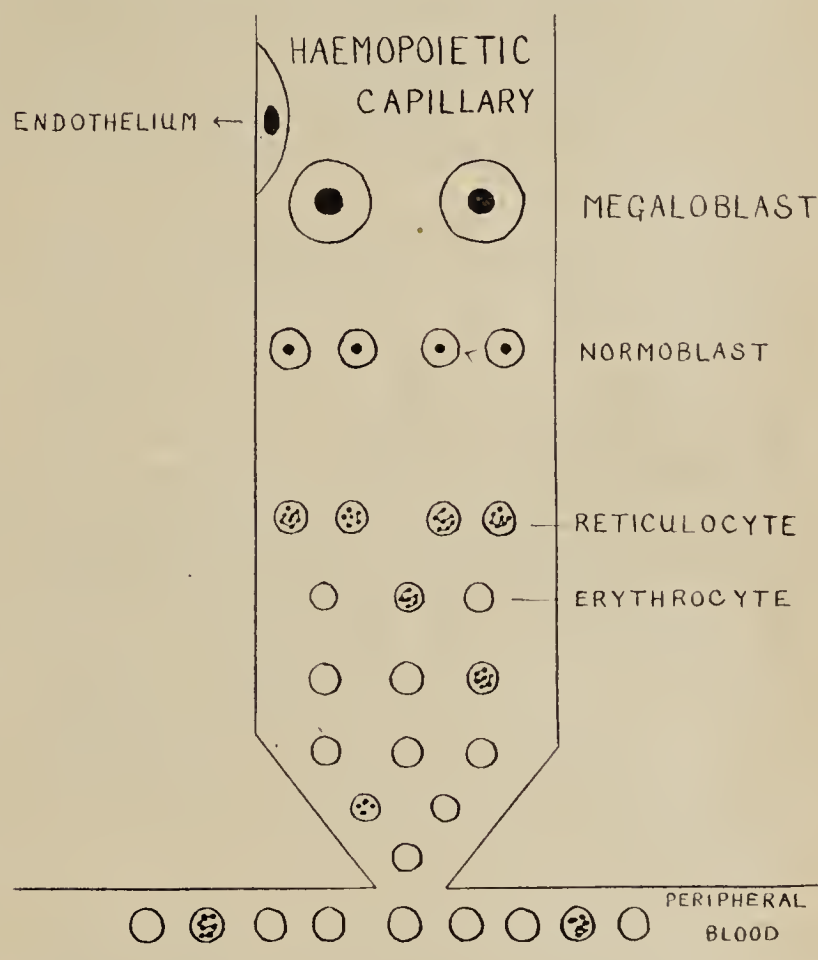


FIG. I (AFTER WITT)

in its reserve and is capable of responding to a much increased demand. Thus if a quantity of blood is lost as a result of haemorrhage, or if some haemolytic agent causes a destruction of red cells within the blood stream, the whole process of erythrogenesis is accelerated and the marrow becomes crowded with normoblasts which undergo rapid maturation into red corpuscles. As a result, sooner or later, depending upon the amount of blood which has been lost, the number of circulating corpuscles is restored to normal. The reserve

power of the erythrogenic tissue is, however, not unlimited. If, therefore, bleeding is recurrent, or if there is constant oozing of blood, or in the presence of continuous haemolysis, the marrow will be unable to supply a sufficient number of red cells to compensate for those which are being lost or destroyed, and a chronic anaemia results. Such anaemia is, in its early stages at any rate, due entirely to an excessive wastage of red corpuscles, and develops in spite of compensatory hyperplasia of the marrow and an output of red cells which is actually greater than normal. This hyperactivity of the marrow in post-haemorrhagic and haemolytic anaemias is evidenced by the presence in the blood of an increased number of young corpuscles or reticulocytes.

For normal erythrogenesis it is essential that the marrow tissue be healthy, and that it be provided with an adequate supply of certain substances which are necessary for the maturation of the primitive red cells and for the elaboration of haemoglobin. If these two conditions are not fulfilled, the output of red corpuscles will be insufficient to meet the normal demand and the blood count will fall. Anaemias so produced, being due to deficient production of red cells, are known as anhaemopoietic anaemias.

The erythrogenic marrow tissue may be injured by exogenous poisons, such as benzol or arsenic, by endogenous poisons as in nephritis, or by bacterial toxins as in acute and chronic infections. It may be destroyed by neoplastic growth involving the bones, or by the tumour like hyperplasia of primitive leucocytes in leukaemia. The severity of the resulting anaemia will depend upon the degree to which the activity of the marrow cells is depressed; its most severe grade is represented by aplastic anaemia, in which there is complete cessation of blood cell formation owing to destruction of the marrow tissue.

Normally there is formed in the

stomach from ingested protein a substance which is necessary for the maturation of megaloblasts into normoblasts. If, owing to a specific defect in gastric function, this substance is not formed, the marrow becomes crowded with megaloblasts, which are unable to develop further; the production of red corpuscles falls below normal, and many of those which are produced are of pathological type, being abnormally large and prone to undergo haemolysis. These specific changes in the marrow and in the blood are those of so-called pernicious anaemia, and, as is now well known, if the missing substance is supplied in the form of liver, liver extract or ventriculin, the megaloblastic hyperplasia of the marrow disappears, normal erythrogenesis is re-established, and the blood is rapidly restored to normal.

Just as this product of gastric digestion is necessary for the maturation of megaloblasts into normoblasts, so there are other substances which are necessary for the maturation of normoblasts into erythrocytes. Some of these, vitamin C and iron, are abundantly present in a normal diet; another, thyroxin, is of endogenous origin. If the supply of any of these substances fails, owing to dietary deficiencies, to defects in digestion so that ingested foods are not properly utilized, or to hypothyroidism, the marrow comes to contain an excessive number of normoblasts which are unable to mature, the output of red cells falls, and these cells which are supplied to the blood tend to be abnormally small and deficient in haemoglobin. (Fig. II.).

It will have been noted that, according to the underlying cause of anaemia, the bone marrow may show aplasia or hyperplasia, megaloblastic hyperplasia, or normoblastic hyperplasia. Also that normoblastic hyperplasia may be purely compensatory and associated with an increased output of red cells, as in post-haemorrhagic and haemolytic anaemias, or may be indicative of failure in cell maturation with a re-

sulting decreased output of red corpuscles, as in so-called nutritional anaemias.

### Classification Of Anaemia.

As anaemia is not a disease but a symptom which is common to many pathological states, it follows that in the interests of the patient it is necessary in each case to arrive at a decision as to the etiological factor or factors which are involved. This may be done without much difficulty, granted familiarity with pathological blood pictures, or it may entail a most painstaking examination of the patient by clinical, radiological and laboratory methods.

From what has been said of its pathogenesis it is clear that cases of anaemia fall into one of two groups: anaemia due to excessive wastage of red cells, and anaemia due to deficient production of red cells; and that these groups may be subdivided according to the following classification:

#### Anaemia.

- I. Due to Excessive Wastage of Red Cells.
  - (1) Haemorrhage.
  - (2) Haemolysis.
- II. Due to Deficient Production of Red Cells (Anhaemopoietic Anaemia).
  - (1) Injury to Bone Marrow.
  - (2) Specific Defect in Gastric Digestion.
  - (3) Defective Nutrition.
  - (4) Hypothyroidism.

Long continued haemorrhage, even though "occult," may lead to intense anaemia. In anaemia due to haemorrhage, in contrast to haemolytic anaemia, the regenerative efforts of the marrow are hampered by the loss of haemoglobin from the body. In haemolytic anaemia while there may be very active destruction of red cells, the liberated and disintegrated haemoglobin is not lost, but is available for the formation of new red corpuscles which are produced in large numbers and can be

demonstrated as reticulocytes, in the blood film. In pure haemolytic anaemia, therefore, while the wastage of red cells may be great, the anaemia over long periods of time may be of mild grade and the patient's health but little impaired. In anaemia due to haemorrhage, on the other hand,

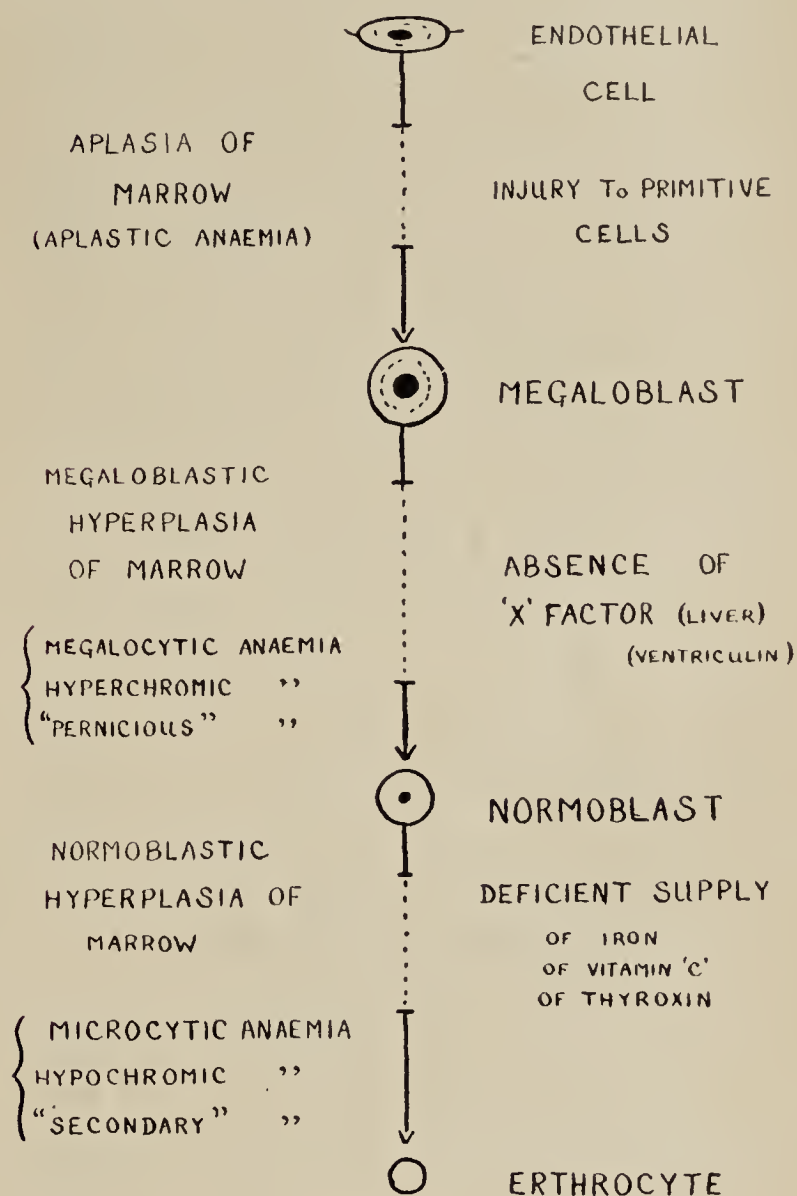


FIG II (After Witt)

there is, owing to actual loss of blood, a scarcity of the raw materials for the production of haemoglobin, and the output of new red cells from the marrow may be quite inadequate to compensate for those which are being lost. The anaemia, therefore, may be severe and the blood picture difficult to distinguish from that due primarily to hypofunction of the marrow. This being so, the importance of examining for occult bleeding in all cases of anaemia of obscure origin cannot be over-emphasized.

In many cases of anhaemopoietic anaemia the relative importance of several possible etiological factors may

have to be evaluated. Thus the anaemia associated with carcinoma of the stomach may be due to malnutrition resulting from anorexia and impaired digestion, to occult bleeding from the tumour mass, to absorption of marrow depressing substances produced by autolysis of tumour cells, or to a combination of these factors. Again, in this disease, with destruction of stomach wall and consequent failure in production of the specific substance which is necessary for the maturation of the megaloblasts, pernicious anaemia may develop. In tuberculosis and in nephritis in addition to the effect of bacterial or metabolic poisons in depressing erythropoiesis and thus producing anaemia, there is often the factor of undernutrition from diminished intake of food. Therefore while it is true that in such conditions the main therapeutic attack should be directed against the primary disease, it should not be forgotten that improvement in the patient's condition may follow treatment designed primarily to stimulate erythropoiesis.

### **Treatment of Anaemia.**

While there are general measures which are indicated in the management of any type of anaemia; such as rest, the prescription of a diet containing adequate amounts of protein vitamins and mineral salts; the eradication of foci of infection, and the treatment of any co-existing disease; in the majority of cases reliance is placed upon the administration of either liver or iron.

It is often very difficult to ensure adequate nutrition in the early stages of treatment, owing to the presence of anorexia and abdominal distress. Indeed patients with chronic microcytic anaemia, with or without achlorhydria often consult a physician because of loss of appetite and abdominal pain rather than because of symptoms more obviously referable to their anaemia. It is important, therefore, to guard against mistakes in diagnosis which may lead to unnecessary surgical operations in this type of case, as in it,

just as in pernicious anaemia, when under appropriate treatment blood regeneration begins, gastro-intestinal symptoms disappear and appetite returns.

Surgical procedures are inadvisable in the presence of severe anaemia and, therefore, it is difficult to decide upon the proper course of action when a focus of infection is discovered in an anaemic patient. If, as may be the case, absorption of marrow depressing bacterial products from the focus is the cause of the anaemia or a major contributory factor, cure cannot be expected until it has been eradicated. The number of cases of anaemia in which focal infection plays an important etiological role is, however, very small and, therefore, an attempt should be made to restore the blood to normal by medical measures before undertaking surgical treatment of infected tonsils, teeth, or sinuses.

### *Liver Therapy:*

Knowing that liver, liver extract and ventriculin are efficacious in the treatment of pernicious anaemia, it is customary with many physicians to prescribe one or other of these substances for every patient with anaemia regardless of the essential nature of the condition. It is necessary, therefore, to emphasize the fact that while liver is of therapeutic value in certain types of so-called "Secondary" anaemia as well as in pernicious anaemia; liver extract, that is the liver extract which is at present on the market, and ventriculin, are potent only in the treatment of pernicious anaemia and allied conditions.

Vaughan classifies the anaemias according to their response to liver therapy as follows:

#### **I. Anaemias Responding to Liver Therapy.**

- (a) Liver extract or whole liver.
  - (1) Pernicious Anaemia.
  - (2) Anaemia of Sprue.
  - (3) "Pernicious Anaemia" of Pregnancy.

- (4) Anaemia following Gastrectomy, Carcinoma of Stomach, Multiple Anastomoses, Multiple Adhesions.
- (b) Whole liver only.
  - (1) Post-haemorrhagic Anaemia.
- (c) Whole liver and iron.
  - (1) Secondary Anaemia associated with Starvation, Carcinoma, Haemorrhage, Dietary deficiency in children.

## II. Anaemias not Responding to Liver Therapy.

- (1) Simple Achlorhydric Anaemia.
- (2) Aplastic Anaemia.
- (3) Erythroblastic Anaemia.
- (4) Secondary Anaemia associated with Sepsis, Nephritis, Scurvy, Hepatic Cirrhosis and Blood Dyscrasia.

Those anaemias which respond to liver extract or ventriculin as well as to whole liver (Group I[a]) are characterised by defective gastric digestion, that is, by failure in production of the "X" factor, by megaloblastic hyperplasia of the bone marrow, and by a macrocytic blood picture. In no other type of anaemia is liver extract or ventriculin of the least therapeutic value.

Whole liver has a striking effect in accelerating blood regeneration after haemorrhage, but in such anaemia, as in the anaemias in the third group (I[c]), this effect is accentuated if iron is given in addition to liver.

### Iron Therapy:

"One of the most significant developments of recent interest in the pathogenesis and therapy of various types of anaemia is the discovery, or rather re-discovery, of the practically specific action of iron in certain forms of anaemia. The value of iron in the treatment of chlorosis has long been recognized, but true chlorosis, in this country at least, is an extremely rare con-

dition. The realization is growing, however, that chronic microcytic anaemias of obscure origin are much more common than was generally believed and that the administration of iron in such cases produces a response qualitatively if not quantitatively identical with that which follows liver therapy in pernicious or macrocytic anaemia." (Cantarow).

Witt studied one hundred and eleven patients with anaemias of this type and classified them as follows:

### *Hypochromic Anaemias (111 Cases).*

- (I) Chlorotic Anaemia: sixteen cases, eight males, eight females; normal gastric secretion.
- (II) Chronic microcytic Anaemias of middle and later life: ninety-five cases, eighty-seven females, eight males; achlorhydria in 90 per cent.
  - (a) Simple achlorhydric Anaemia: seventy-five cases, sixty-seven females, eight males; achlorhydria or extreme hypochlorhydria in all.
  - (b) Plummer—Vinson Syndrome of dysphagia and anaemia; thirteen cases, all females. Achlorhydria in four, extreme hypochlorhydria in one, low normal acidity in one and average normal in one.
  - (c) Chronic Abdominal invalidism with Anaemia but normal test meal. Seven cases, all females.

Heath classifies the anaemias which are known to respond to iron as follows:

### *Anaemias Which Respond to Iron Therapy.*

- 1. Chronic blood loss.
- 2. Dietary deficiencies.
- 3. Gastro-intestinal disorders (interference with assimilation of materials necessary for blood formation).
- 4. Pregnancy (transfer of haemoglobin building materials from mother to foetus).

The minimum satisfactory response to iron therapy is a rise of one per cent. of haemoglobin a day after the first week of treatment. It is striking that when a pathological marrow is returning to normal as a result of treatment, the first sign of regeneration which is demonstrable in the peripheral blood occurs on or about the fifth day after treatment has been begun. This is the case when pernicious anaemia is treated with liver, liver extract, or ventriculin; when leucopenic states are treated with pentose nucleotides, according to the method of Jackson and his co-workers; and when microcytic anaemia is treated with iron.

To obtain the optimum response to iron therapy it is necessary to give very large doses. It was ignorance of this fact that led to disappointing results in the past. Iron and ammonium citrate probably is the most satisfactory preparation and should be prescribed in doses of 60-120 grains daily. It is surprising how well these large doses are tolerated. Occasionally patients complain of abdominal cramps and diarrhoea, but these symptoms are transient, disappearing within a few days. Very rarely malaise, nausea and vomiting will necessitate reduction in dosage and consequent less satisfactory response to treatment.

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the relatively high value of Newfoundland oil.” “The northern fish grow more slowly than those frequenting the southern shores” (e.g. Newfoundland—due probably to the warmer temperature of the Gulf Stream).

—from “The Relative Values of Cod Liver Oils from Various Sources,” by J. C. Drummond and T. P. Hilditch.

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\* J. Soc. Chem. Ind., 1923, 42, 185, 205.

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# THE PRE-ECLAMPTIC STATE\*

## PART I.

By HELEN I. McKINLEY, M.D.  
Hospital for Sick Children, Toronto.

Two main motives are responsible for the writing of a paper on this subject. One of these is because of the opportunity provided to review and study both the clinical and the pathological viewpoint of a subject which at best is very vague and indefinite. The other is to point out how the appalling number of deaths from toxæmia can be reduced to practically nil if certain easily recognizable prodromal symptoms, which serve as danger signals to those able to interpret their significance, are heeded as soon as they become apparent. This very real problem is evidenced by the following facts:

(a) Toxaemias constitute about 35% of the causes of maternal mortality.

(b) Twenty five per cent. of maternal deaths throughout the world are due to eclampsia.

(c) Approximately 30,000 women die annually from eclampsia throughout the world.

(d) From 25—33% of women affected with eclampsia die, and this has hardly been affected by changes in treatment during the last twenty years.

(e) The mortality for the child is 35—60%.

(f) Toxaemias are the only cause of maternal mortality which pre-natal care will successfully control.

(g) Eclampsia is becoming rarer each year because of better prophylaxis.

(h) Adequate pre-natal care will deal almost always successfully with toxæmias.

### Definition.

Until recently, there has been some difficulty and confusion regarding what is actually meant by various authors when they use the term "eclampsia" itself. However, it seems pretty generally agreed that a diagnosis of eclampsia is made only on those cases of late primary toxæmia which have had one or more actual convulsions, no matter how severe any other clinical or laboratory findings may be.

Before the stage of convulsions or fits is reached, there is a stage more or less long, full of symptoms and signs of a most varied nature, which serve to call our attention to what is pending. This stage is called the Pre-Eclamptic State, or Pre-Eclampsia, and the woman is said to be threatened with convulsions.

The term Eclampsism was suggested by Barr for this condition of preparedness for convulsions, who limited the word to true primary toxæmias. DeLee recommends its general adoption, but spreads its application to cover all those cases of so-called toxæmia in late pregnancy, which may lead, if untreated, to convulsions or coma, or both. Eclampsism has the advantage over pre-eclampsia in that it does not imply the inevitability of convulsions, but merely a state of threatened convulsions.

According to Stander, eclampsism is synonymous with severe pre-eclampsia, and he suggests that the term be limited to the relatively small group of cases in which the patient presents the signs and symptoms and laboratory findings of eclampsia but has not as yet developed convulsions. In other words, pre-eclampsia is essentially

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\* Part of a Sixth year pathological thesis.

eclampsia before the outbreak of convulsions or coma.

This definition of Stander seems to be the most logical, and is the one in favour at the present time.

### Incidence.

According to the statistics of Stander from the Johns Hopkins clinic, pre-eclampsia, when used in the above restricted sense, is relatively rare, not exceeding 5% of all toxæmias of the latter half of gestation, and occurring about fourteen times in every 1,000 deliveries. Further statistics regarding the incidence of pre-eclampsia at the various clinics are not available. In comparison, the incidence of eclampsia as gathered from the figures of various authors, appears to be about 1 in every 500 or 800 deliveries. The incidence in obstetrical clinics is approximately 1 in every 150 births, because of the proportionately excessive number of seriously ill patients referred to hospital for treatment.

The following factors are closely associated with the frequency of occurrence:

(a) **Weather.** Eclampsia varies in frequency at different times of the year. The consensus of opinion seems to be that unsettled, damp and cold weather, as usually occurs in the spring months, is accompanied by an increase in the number of eclamptic patients. Sachew suggests that the fact that the wet months interfere with the excretory functions of the skin may be an explanation.

(b) **Mode of Living.** Kosmak says eclampsia is as prevalent among the poor as the well-to-do. Von Heuss found that in Germany 73% of fatal cases occurred in women of the industrial classes living in large cities as against 12% living in the country, and attributes this variation to differences in diet and hygiene.

(c) **Regional Variations.** Eclampsia is much more frequent in England than in France, is very common in Glasgow, much less common in Germany, and almost unknown in South-

ern China, most of India, Syria, Palestine and Egypt. It is therefore more common in northern countries.

(d) **War.** Incidence was greatly reduced in the countries affected by the so-called hunger blockade, and gradually returned after the blockade lifted. The chief reason for this is thought to be the high carbohydrate and low fat and protein diet which this condition necessitated.

(e) **Parity.** Primiparae are more apt to be affected than multiparae, and both multiple pregnancies and hydramnios are generally assumed to be predisposing factors. Hinselmann and Zangemeister give approximately the same ratio of multiparae to primiparae, i.e. 1 to 7 or 8.

(f) **Age.** 90.2% of all cases of eclampsia occur before the age of 30, the age of predilection being 21 to 25. The majority of first pregnancies are between the ages of 19 and 24, and since it occurs 7 times more frequently in primiparae, it is easily seen why the incidence is very high at this period.

(g) **Recurrence.** Eclampsia may recur in subsequent pregnancies, although it undoubtedly confers a relative immunity. Hinselmann reports recurrence in 1.92%. That is, in 10,000 cases of eclampsia, recurrence in subsequent pregnancies will be noted in 192.

(h) **Constitution.** The so-called pyknic type—large chest, head and abdomen, with tendency to obesity and relatively small extremities—is especially prone, and it is many times more common in blondes than in brunettes.

(i) **Mortality.** The mortality of eclampsia is estimated at from 25 to 33% and even more for the mother, and from 35 to 60% for the child. In recent years improvement in these high mortality rates has been noted, due unquestionably to better prophylaxis.

### Etiology.

Titus remarks that it is unfortunate that Zweifel has dubbed eclampsia "the Disease of the Theories," since this tends to produce an attitude of

hesitancy in venturing to advance another.

Whitridge Williams says that for any theory to be regarded acceptable, it must explain satisfactorily certain pathological and clinical facts, of which the following are of chief concern:

1. The predisposing influence of primiparity, multiple pregnancy and hydramnios.

2. That the disease is more common in northern countries than in the tropics.

3. That its incidence increases as pregnancy approaches term.

4. The genesis of the characteristic hepatic lesion.

5. That marked oedema is usually a favorable sign, while its absence adds to the gravity of the prognosis.

6. The intra-uterine death of the foetus is usually followed by improvement.

7. That a milk diet which is high in protein and mineral constituents is as efficacious as one low in protein and mineral.

To these another might be added: The proneness of toxæmic patients to sepsis.

Stander and Kosmak in their monographs have reviewed briefly a dozen or more of the current theories, and come to the conclusion that concerning the etiology of eclampsia, no hypothesis so far suggested is accompanied by sufficient evidence or experimental proof to be considered conclusive. More information, which may lead to an understanding of the disease, has been accumulated on the chemical changes in the blood.

Of the theories held to-day, the majority strongly adhere to the toxic origin of eclampsia. Perhaps future discoveries may demonstrate that the offending material is a result of a deficiency in the hypothetical neutralizing or detoxifying agent.

### Diagnosis.

The disease seldom commences before the twenty-fourth week of preg-

nancy, although a few cases are recorded as early as the sixteenth to the twentieth week.

Though the term pre-eclampsia has come into general use, and though many cases showing the symptoms characteristic of the pre-eclamptic state eventually develop convulsions, the condition does not inevitably terminate in eclampsia. From a clinical and chemical standpoint, it is impossible at present to separate sharply those patients in whom convulsions will develop from those who go to term without further symptoms. The term pre-eclampsia is used here to indicate those cases which show the type of renal functional failure, the high blood pressure, and the other symptoms which precede eclampsia; but it must be recognized that patients in this condition are to be regarded as potential eclamptics rather than as cases which, unless treated, will inevitably terminate in eclampsia.

The most important symptoms of this condition are:

- (a) Raised blood pressure.
- (b) Alterations in the urine.
- (c) Oedema.

This triad of symptoms are also those of the other members of the albuminuric-hypertensive group of so-called toxæmias, and there is at present no known method of distinguishing, ante-mortem, between the members of this group. A history of Scarlet Fever or of definite attacks of Acute Nephritis, or the presence of an albuminuric retinitis is invaluable in the diagnosis of a chronic nephritis, but does not rule out a super-imposed eclamptic toxæmia. A similar difficulty is met when the typical eye-ground changes of essential hypertension are discovered. The low-reserve kidney of Stander may also cause some confusion, although a history of recurrence in preceding pregnancies with complete freedom from signs and symptoms in the intervals, is strongly suggestive. However, if a patient, seen for the first time in the latter three months of preg-

nancy, exhibits one, two or three of the above symptoms, the only possible method of differentiation in many cases is her immediate post-partum progress. By this is meant the complete disappearance of all signs and symptoms within four to six weeks after delivery. Hence it is evident that it is only by follow-up work in post-natal clinics that a provisional diagnosis of pre-eclamptic toxæmia is confirmed.

### Signs and Symptoms.

As mentioned under the heading of Diagnosis, the most important signs of pre-eclampsia are hypertension, albuminuria and oedema.

(a) **Blood Pressure:**—A rise in the systolic pressure is one of the most constant signs of the pre-eclamptic condition, and without the presence of such a rise, the diagnosis remains in doubt. According to Irving, who examined a series of 5,000 cases of pregnancy, an increased blood-pressure may be the first indication of toxæmia, and may precede the appearance of albumin in the urine. In his series of definitely toxic cases, the relationship of a rise in blood pressure to the albuminuria was as follows.

Raised Blood-pressure—

Preceded albuminuria in 50 cases.

Accompanied albuminuria in 113 cases.

Followed albuminuria in 24 cases.

The relationship between a rise in the blood-pressure and definite symptoms of toxæmia is illustrated by the following figures of Irving:

Of cases showing a systolic blood-pressure of—

130-140—1 in 32 developed toxæmic symptoms.

140-150—1 in 11 developed toxæmic symptoms.

150-160—1 in 3 developed toxæmic symptoms.

160-180—1 in 2 developed toxæmic symptoms.

180 upward—all developed toxæmic symptoms.

In practice a systolic pressure above 140 mm. Hg. should therefore be looked upon as suspicious. In the majority of eclamptic and pre-eclamptic patients much higher figures are found. A rise also occurs in the diastolic pressure, but as this is relatively less than the increase in the systolic, the pulse-pressure tends to be greater than normal.

In most pre-eclamptic patients, the raised blood-pressure, when once established, tends to remain at a relatively constant level, the variations from day to day amounting to less than 10 mm. of Hg. A gradual fall is the best indication of improvement in the patient's condition, in some cases the result of foetal death. A steady rise, even in cases in which the oedema is diminishing, and the amount of albumin in the urine is decreasing, indicates a change for the worse, and a sudden rise is frequently the immediate prelude of convulsions.

No definite figure can be given as indicating the level at which fits are likely to occur, and, speaking broadly, the course of the blood-pressure in a pre-eclamptic patient is of more importance than the actual level attained.

As a rule, after delivery, the blood-pressure begins to fall. In some cases, especially those showing a large diuresis, the fall is rapid, and a normal level may be reached in three or four days. In others the fall is more gradual, and frequently interrupted by periods during which the pressure remains at a constant level; in such patients three weeks may elapse before a normal figure is reached. In a third variety of case, delivery is not followed by a fall in the systolic pressure, which remains unaltered for two or three days after the birth of the child. It is in this type that post-partum eclampsia may be looked for in patients who have shown no convulsions previous to or during delivery. It is important, therefore, in this form of toxæmia, to follow the blood pressure until a definite and steady fall has commenced. There appears, how-

ever, to be no cor-relation between the ultimate degree of recovery and the rapidity of fall of blood-pressure; in all cases of this type of toxaemia a good ultimate recovery may be looked for.

(b) **Urine** The presence of albumin in any quantity will naturally lead to a further investigation, and it is only by the routine examination of the urine in all cases of pregnancy that the pre-eclamptic state will be discovered. The common findings are discussed under heading "Chemical Findings" in Part II of this paper.

(c) **Oedema**—The amount of oedema present varies considerably in different cases. In some it is marked, while in others it may be apparently absent. In these latter cases, however, it will be found on recovery that a general subcutaneous puffiness has actually been present; the appearance of the patient's face and hands are definitely altered after improvement has set in, and a moderate diuresis often occurs. These minor degrees of oedema cannot, unfortunately, be followed by daily weighings during pregnancy and the puerperium, but the facial appearances suggest that some retention of water is present, even in cases which show no definite oedema and no pitting over the shins on pressure.

Oedema of sudden onset, which becomes marked in the course of a few days, should be very carefully watched, as rapidly progressive oedema of this type rarely occurs in pregnancy apart from eclamptic toxaemia.

While in some cases the pre-eclamptic state lasts for some weeks before convulsions actually occur, and while in other patients the condition terminates with delivery without the development of eclampsia, cases are met with in which the first symptoms recognized are those which are the immediate precursors of the fits. In many of these a careful enquiry will elicit the fact that slight facial puffiness or a little oedema of the feet have been noticed for some days before the appearance of the more urgent symptoms. In a

few, however, the first symptoms noted have been the vomiting and headache which usher in the convulsions, and occasionally no definite history of a pre-eclamptic condition may be obtainable.

\* \* \*

The symptoms which immediately precede the fits are:

(a) **Gastric disturbances.** — Severe nausea or actual vomiting, accompanied by epigastric pain, occurs in about 25% of all cases, and usually precedes the onset of convulsions by only a few hours, although in a few cases a longer history of these symptoms may be obtained. The first danger signal, especially where there has been no pre-natal care, is frequently a complaint of sharp epigastric pain or failing vision.

(b) **Headache.**—This is severe in character and of fairly rapid onset, and entirely different to the dull headache associated with chronic renal disease. Accompanying the headache in some cases are attacks suggestive of petit mal,—that is, temporary loss of consciousness.

These symptoms usually so closely precede the fits that it is doubtful even if active treatment is commenced at once whether convulsions will be prevented. Nevertheless, they are a valuable warning, indicating that the occurrence of convulsions is imminent.

(c) **Disturbances of Special Senses.**—These are present in nearly all cases. In some mild cases, dimness of vision, black specks before the eyes, bright lights, spangles and hemianopsia are often a complaint. In severer cases, partial loss of the fields of vision, transitory attacks of blindness or complete amaurosis due to oedema or retinitis, sometimes with haemorrhages, may occur. Photophobia, ringing in the ears, even deafness and occasionally anomalies of taste and smell occur. These may be manifestations of central or peripheral lesions. The actual changes in the disc usually consist of slight swelling and some cloudiness, which disappears rapidly as recovery takes place.

## AN UNSCHEDULED COURSE\*

By E. S. RYERSON, M.D., C.M.

Assistant Dean and Secretary of the Faculty of Medicine.

When a student graduates in Medicine, he will have learned more than is laid down in the curriculum. He cannot fail to realize that as an individual he is different from the freshman who was initiated five or six years before. The development of this inner self has taken place unconsciously as he has listened in the lecture theatre, worked in the laboratory, studied in his room or engaged in one or other of the athletic sports. Many students, unfortunately, fail to pay sufficient attention to this aspect of their education. They consider that they have done their part when they have conscientiously studied their Anatomy, Physiology, Clinical and other subjects, without realizing that the knowledge of all the subjects of the curriculum is merely a means toward an end and that this has been gained under the direction and supervision of professors and teachers. After graduation they have to depend solely upon their own efforts to further their knowledge by actual experience, and if they have failed to learn how to educate themselves and how to judge the value of data and how to benefit themselves by experience they will soon sink into the rut of dull routine.

The characteristic which it is so essential for each student to acquire while an undergraduate is the ability to educate himself. This can only come through his own efforts, although a certain amount inevitably does come by the instinct through which he learns by experience. The quantity, however, is so insignificant that it soon dies out and leaves the man in a state where he is unable to further improve himself.

The student in his undergraduate

course should acquire, not only a knowledge of the principles in each and all of the subjects of the course, but the power of adjusting this knowledge from year to year. He must learn to be his own educator. He must learn to take advantage of his own personal experience. Such a power can only be obtained by seeking for it.

At the beginning of the course as a whole and of each of its component parts, the student is necessarily dependent on his instructors; as the course develops he should form opinions of his own and be able to judge efficiently as to the value of this or that theory, and then check up his conclusions by consultation with his clinician or teacher. In his final year, when he is thrown on his own responsibility in the Hospital wards and has only a small number of fixed hours of instruction under supervision, he should be able to educate himself by personally solving the problems of diagnosis, prognosis and treatment of each case in the wards to which he is assigned. He should imagine that each patient is one for which he is personally responsible and whose life or death depends on the conclusions he reaches as a result of his study of the history, of his method of physical examination and of his interpretation of laboratory or X-ray findings. Only by meeting and solving living problems will he gain experience that will prove of value in the future.

In order to become a self-educator, a student must gradually eliminate the necessity for a teacher. Let the student make his objective at graduation not only the acquisition of the essential facts and ideas and theories necessary for the practice of medicine, but also the power and ability of edu-

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\*Reprinted from this Journal, 2, 1924, page 61.

cating himself, for only by such an accomplishment will he be able to do justice to himself, to be a credit to his profession and to do his part in preventing and relieving the sufferings caused by disease.

The tendency of students to implicitly believe in the truth of such and such a fact or idea, because a certain professor said so, or an author wrote it in a text-book, results in the student subordinating the evidence of reason to that of authority, and in this way, prevents the student from a realization of the importance of personally investigating by scientific methods the premises on which the statement was based and the process of reasoning by which a logical conclusion was arrived at. The student should give the same consideration and weight to the evidence the teacher presents in support of an idea, as he does to the conclusions, for by so doing he will be able to logically satisfy himself of their veracity. By the assumption of this attitude to his professors and text-books and authorities in general, the student will develop his own opinions, initiative and individuality, so that he will be able to stand on his own feet and have ideas of his own and not merely those of others. "What others may teach you may be good enough to assist you in your search for knowledge, but you should be able to think for yourself and not cling to the coat-tails of any authority, no matter how big-sounding the title of the latter may be." (Paracelsus). "While teachers may be real authorities in subject matter, they can never be anything more than assistants in the self-development of their students. They should more openly assume this subordinate position, placing the primary responsibility upon the learner."

Knowledge cannot be given by the teacher; it has to be taken by the student. What goes on inside the mind of the student is of more importance to him than what was in the mind of the teacher who explains it or the author

when he wrote his text-book. Since students cannot acquire the thoughts of their instructors any more than they can acquire their headaches, they have to find ways of generating thoughts without themselves by the help of their teachers. They must not expect to find knowledge ready made, but realize that their task is to develop it, each out of his own experience. If their work is done on this principle, it will be in the active and not in the passive voice. They bring up from their own observation and past experience whatever they already know that has a bearing upon the problem whose solution they are seeking; they question their fellow-students, the house doctors, the demonstrators to get the information that their specific undertaking requires them to get; they consult their books and libraries. In all this they are learning to work purposefully, to put two and two together to accomplish what they want, to pick out the important from that which has less significance, to make up their own minds, to organize their ideas, to use their own language, to doubt, to question and to prove.

Every student who gives the necessary attention to this unscheduled course of the curriculum, will inevitably acquire the power and ability to educate himself and such an accomplishment will insure his future success in life.

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### **"HIGHWAYS TO HEALTH."**

An event of outstanding interest to students in Medicine was the publication this summer of a book on Public Health by Don Solandt of the class of '33. We have been honoured with a short review which we publish in the next issue of this book, from the pen of J. K. W. Ferguson, M.A., M.D., a class mate and close friend of Dr. Solandt. While the book has not yet been authorized as a Public School text in Ontario, it is hoped that it will shortly be received in other provinces.

## HEAT REGULATION\*

By R. E. HAIST, B.A., '36.

Independence has been a goal for human endeavour since the world began. Man attempts to gain independence of his thermal environment by the use of fire and of protective insulation in the form of clothes and houses. This is a type of voluntary heat control, but there is a more important and fundamental heat regulatory mechanism within the organism itself. It is automatic in action and achieves its end by balancing heat production and heat loss. By means of this regulation, an organism may possess a uniform temperature despite environmental changes. Such an animal is called a homeothermic animal. The condition of homeothermism is a product of gradual evolution, but it constitutes a very necessary and important adaptation to the terrestrial life.

In order to understand why the maintenance of a constant body temperature is important we must consider several factors. First, let us consider the effect of temperature upon biological processes.

All the activities of an animal are dependent on the liberation of energy by exothermic, oxidative processes. Since it is well known that temperature changes exert a marked influence on the rate of chemical reactions, we might expect the physiological processes of the organism to be similarly affected. Such is the case. A rise in temperature of ten degrees Centigrade increases by two or three times, the rate of the heart beat, muscular contraction, velocity of nervous impulses, and many other functions of the body. For both warm and cold-blooded animals there is an increase in combustion of ten per cent. per Centigrade degree rise in body temperature.

Bearing in mind this relationship

between temperature and biological reaction, it will be seen that, lacking an adequate heat-regulatory apparatus, change in external temperature would result in a proportional change in body temperature and bodily reactions. This is what occurs in cold-blooded or poikilothermic animals, such as reptiles, batrachians, fish, molluscs and insects. One of the great disadvantages of poikilothermism lies in the fact that the extent and type of activity is dependent on the external temperature. You will recognize that an organism whose vital reactions are unaffected by its surroundings has not only a wider scope for its activities, but also a greater chance for survival in a changing climate.

In the higher animals we find a remarkable constancy in many of the internal factors such as temperature, composition and H-ion concentration of its constituent parts, and so on. This internal constancy gives an independence of external conditions. In mammals, internal temperature increase, in addition to changing the rates of the physiological processes, may upset the normal constancy of several other factors. For example, the increased respiration incident on the higher temperature may lower the  $\text{CO}_2$  tension of the arterial blood and an alkalaemia may result. Thus, by changing one of the normally constant factors, temperature, the constancy of the others is altered.

There is a marked temperature limit for the reproductive organs. Moore and Oslund showed that an animal can be sterilized by its own body temperature, degeneration of the ram's testis being brought about by its removal to the peritoneal cavity.

Coagulation of muscle proteins begin at 47 degrees Centigrade. Animals enzymes have their optimal activity between 37 degrees and 53 degrees Centigrade and are inactivated as a rule,

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\* Presented before the Physiology Journal Club, 1933

by temperatures higher than 60 degrees Centigrade. Cooling reduces the reflex irritability of the spinal cord. All these things that have just been cited, as well as those mentioned in the previous paragraphs, serve to give us some idea of the importance of heat regulation, but the most convincing argument for our need of this is given by the range of temperature compatible with life.

Temperature limits vary with different creatures, the greatest extremes recorded for living organisms being from  $-271$  degrees to  $+150$  degrees Centigrade. There are cases recorded where a body temperature as high as 46 degrees and as low as 24 degrees Centigrade did not end fatally, but these are extreme. Usually the temperature limits are narrower than this. Maintenance of a fairly constant temperature in man is therefore not merely desirable because it allows the optimal functioning of the parts, it is essential for the very life of the animal.

The relatively constant temperature of the homeothermic organism is obtained by balancing heat production and heat loss. Let us first consider the production of heat in the body.

Lavoisier, in 1778 showed that animal heat is due to oxidation and that more oxygen is used by a cooled than by a warmed man. Later investigators, in their work on heat production and metabolism have shown definitely that exothermic chemical change is the source of animal heat. Others have indicated the site of heat production by measuring the rate of oxidation in the various tissues.

It is found that, while voluntary muscle consumes about the least and glandular tissue the most oxygen per unit weight, both when resting and when strongly active, yet of all the tissues concerned, voluntarily muscle is the most important in heat production. Glands, particularly the liver and kidneys, play a part, but to a lesser extent. There are several good reasons why skeletal muscle is so important: (1) It forms more than half the

total weight of the soft parts of the body. (2) It is rather generally distributed and not confined to one region, as the glands. (3) The increase over the resting oxygen consumption and heat production, when the tissue is strongly active, is about four times as great in skeletal muscle as it is in glandular tissue.

We must now consider the effect of external temperature changes on the total heat production. We have seen in cold-blooded animals that a fall in external temperature brought a fall in heat production, but in the warm blooded creatures, a fall in external temperature has no effect until it reaches a point, usually around 14 degrees C., below which a rise in metabolism and heat production occurs. This is called the chemical method of heat regulation.

The question of whether other mechanisms than voluntary or involuntary muscular movement had a part in the increase in heat production was much disputed formerly, but now the bulk of evidence is in favour of the conclusion that increase in metabolism may be had without shivering, though shivering is recognized as the method by which the greatest and most sudden increase is obtained. It is suggested that humoral influences are responsible for this augmentation when shivering is absent.

That exposure to cold increases the output of adrenalin has been shown by means of the "denervated" iris, by means of the "denervated" heart and by histological methods. Boothby, Saniford, Soskin and others have demonstrated that the injection of adrenalin increases metabolism.

Let us examine some of the ways in which adrenalin might play a part in increasing heat production: (1) It mobilizes liver glycogen; (2) It causes a vasodilatation in the skeletal muscles and a vasoconstriction in the skin and splanchnic areas, thus permitting a large volume of blood to be sent under high pressure to the skeletal muscles, which are the chief agents in heat pro-

duction. (3) The blood is concentrated by contraction of the spleen and possibly also by the action of the liver. (4) The volume of blood passing through the lungs is increased. By these means, the supply of readily combustible material and of oxygen is increased at the site of major heat production. But if, at that time, neither oxygen concentration nor supply of combustible material is the limiting factor in metabolism, no increase in heat production would result *unless adrenalin has a direct stimulating action on cellular metabolism.*

We have seen that adrenalin can cause increased heat production and that, on exposure to cold, an increased output of adrenalin is demonstrable. It would thus appear that adrenalin could play a part in the chemical regulation of heat.

Recent experiments show that in adrenalectomized animals it is absence of cortex rather than of medulla that is responsible for the lowered metabolic rate and the lowered resistance to cold. Injection of cortin increased the resistance to cold in such animals while adrenalin did not. The effect of cortin has been explained as due to the more nearly normal muscular activity which it allows in these experimental animals. Though it seems that the substance liberated by the adrenal cortex is essential to the regulatory process and apparently must be present before adrenalin can have its normal effect, yet there remain sufficient grounds for believing that adrenalin itself plays a part in the regulation against cold, especially since its calorogenic effect can be had without visible muscular movement.

The thyroid gland also has a part in the production of heat. Thyroidectomy causes a decrease in metabolism of from 13 to 31%, though the animal can still vary production in response to temperature change, but from a lower baseline. Injection of thyroxin increases the metabolic activity, administration of one milligram resulting in the liberation of as much as 1,000 calories. This

increased metabolism due to thyroxin is not due to muscular activity or fibrillation or increased tonus, but seems to be due to a catalytic action which regulates the rate of the metabolic process. It mobilizes liver glycogen and exerts its effect in the absence of the adrenals. Evidence of a varied activity of the thyroid in response to temperature changes has been produced. Apparently exposure to cold stimulates secretion. The effect of the thyroid activity begins more slowly and lasts for a longer time than that of the adrenals. The maximum effect of thyroxin comes ten days after injection. Boothby says that the curves showing the calorogenic effect of thyroxin and adrenalin are similar, provided the time factor in the case of thyroxin is scaled in days while that for the adrenalin is scaled in minutes. Adrenalin is useful for rapid adjustments, thyroxin for slow ones.

The effect of certain other endocrine organs on heat regulation has been examined. Removal of the gonads in rabbits causes an effect similar to thyroidectomy, but to a less extent. Parathyroidectomy has no effect.

Not all substances which are calorogenic in nature can be said to play a part in heat regulation in the normal, intact animal. The changes in heat production may occur through a disfunction owing to the changed internal conditions. However, there seems to be sufficient evidence that not one, but several humoral factors operate in the regulation against cold by stimulation of increased production of heat.

When an animal is cooled, these humoral influences on metabolism form the first line of defence, but if the resultant increase is inadequate and temperature still tends to drop, shivering occurs and a sudden, pronounced increase in metabolic rate which may be 60 to 90% above basal level is evident. This shivering may be reflex, produced by impulses from peripheral stimulation by way of a nerve centre, or central, produced through direct cooling of this centre itself. It is very

probable that the centre for shiver corresponds with the general centre for heat regulation, even though isolated responses may be obtained below this in the central nervous system.

Homeothermism is not obtained by isolated reactions, but only through a co-ordination of all the factors, not only those concerned with heat production, but those related to heat loss as well. Most of the various factors involved are represented in the diencephalon, and this portion of the brain may act as a "heat centre" through its co-ordination of the various responses. The evidence for a central control of heat regulation has been obtained chiefly by observing the thermal reactions of animals after removal or section of successive parts of the central nervous system from above downwards and from below upwards. Magnus intimates that in mid-brain preparations heat regulation is lacking, but in "thalamus animals" the regulation is present. This, and many other observations show the centre to be anterior to the mesencephalon. It seems quite probable that it is in the hypothalamic region, especially since Isenschmid and his colleagues show that, in the rabbit, the focus of these nervous connections is at the base and sides of the third ventricle from the infundibulum anteriorly to just in front of the mamillary bodies posteriorly. This region is indirectly connected with several sympathetic outflows, for example, —cardiac augmentors, vaso-motor, pilo-motor, nerves to sweat glands and pupilo-dilators. Beattie's work, indicating the presence in the hypothalamic region of sympathetic and possibly parasympathetic centres, would suggest that this region is closely related to those portions of the nervous system exercising visceral and glandular control. The afferents are very numerous. Through the optic thalami it is in connection with nerves of temperature sense from the whole body and other sensory nerves also. The higher centres appear to be connected with it, since, in hypnotised persons, sugges-

tion of cold brings the appropriate regulatory reactions though the physical environment is itself warm.

There seems to be evidence that this heat centre not only operates through a co-ordination of impulses received from the periphery, but is also directly sensitive to temperature, and responds so as to regulate production and loss. Were this not so, the regulatory reactions would work progressively, for instance, exposure to cold by stimulating production and diminishing loss of heat would give rise to a progressive increase in body temperature.

The nervous mechanism thus consists of afferent neurones with special endings in the skin, efferent neurones, activating various means by which heat production or heat loss is varied, and a central co-ordinating mechanism which, in addition to its co-ordination, may be directly sensitive to temperature variations.

We have discussed the nervous and hormonal factors concerned with increasing heat production in response to external cold. Will exposure to external heat diminish production? Various observations on Europeans living in tropical climates show a reduction in Basal Metabolism. However, there seems to be considerable variation in results. Seasonal differences in metabolism are evident, mean monthly heat production varying inversely as the mean monthly temperature. Other evidence of change in metabolism in response to heat has been produced, but the evidence for a dependable reaction is inconclusive. This change in response to heat, if present, is a slow one, and is probably more in the nature of an adaptation than a regulatory reaction which could be used in compensating sudden changes in temperature.

Now we will leave the consideration of the part which variation in production plays in heat regulation, and look at the other side of the balance, at the phenomena concerned with heat conservation and heat loss.

Heat is lost to the body by radia-

tion and convection, by evaporation from the skin and lungs, and in the excreta. The loss through the latter is negligible. According to Rubner, at 15 degrees C in air which is 50% saturated with moisture, a man normally clothed and at rest loses heat as follows:

44% by radiation.  
25% by evaporation.  
31% by convection.

Aldrich obtained results that were very similar. He found, moreover, that radiation from the skin and clothing is approximately the same as from a "black body," or perfect radiator, and that, at a temperature of 27 degrees C, this radiation lies between the wave lengths of  $4\mu$  and  $50\mu$ . The amount of heat lost by radiation depends, of course, on the difference in temperature between the body and its surroundings. If the external temperature approaches or exceeds the skin temperature, or if the sun shines strongly upon the subject, losses by radiation and convection are made smaller or the heat transfer may even be reversed. Evaporation is then solely responsible for heat loss. Even when resting this must amount to at least 2 cc. of water per minute, while, with fairly strenuous work, about a pint of water an hour, or three gallons a day, will have to be evaporated, under these conditions. Such requirements have been recorded from actual experience. (Hunt).

Evaporation takes place from the respiratory passages and from the skin. That from the respiratory passages is not as important in man as in some other animals. Air is inspired that has, let us say, a temperature of 20 degrees C. and is 50% saturated. The expired air has a temperature varying from 30 degrees to 35 degrees C. and is 98% saturated. Thus considerable heat is eliminated. During quiet respiration of moderately dry air the heat loss through evaporation in this manner might amount to 4 or 5 large calories per hour, or approxima-

tely 7% of the total heat loss. Though this is considerable, yet by far the greater part of the heat loss by evaporation is from the skin surface.

There are two means by which water arrives at the skin surface:

(1) Through imbibition by the epidermis from the underlying cutis.

(2) By the active secretion of sweat.

The epidermis loses water from its free surface and imbibes more from below by means of its hydrophilic colloids. This transpiration or transudation is not accompanied by transfer of NaCl. Observations on people with congenital absence of sweat glands show that transpiration can account for the loss of .18 calories per minute, which is sufficient only under ordinary conditions with little activity. As long as the evaporation rate is greater than the rate of secretion of the sweat glands, there will be no apparent sweating. This insensible perspiration, which includes transpiration as well, is regular, unaffected by considerable environmental variations (air movements and removal of clothing), and proportional, at rest, to the basal metabolic rate. It has been found possible to predict the Basal Metabolism from insensible perspiration.

When the environmental temperature is high, visible sweating occurs, and the fluid loss is great. It may exceed one litre per hour. Hunt says that, in this way, a coolie can lose 10% of his weight or twice the volume of his blood without ill effect. The relative importance of local temperature and body temperature in sweating has not been shown conclusively as yet, though considerable work has been done in this field.

We have considered how heat may be lost from the body surface. But this is not the site of major heat formation, so we must have some means of transferring the heat from the point of production to the surface. Conduction plays a part, but the blood is obviously the most efficient vehicle of transfer. Water makes up about 90%

of the blood volume, and is the important factor in the transfer of heat. Some of its physical properties which make it a good medium through which heat loss may be effected are: (1) Its mobility. (2) Its high specific heat, and (3) its high latent heat of vaporization.

We could increase the heat loss by bringing more of the "heat-carrying" fluid in close proximity to the surface where it could be eliminated, by increasing the transfer of water to the surface, or by increasing the total volume of the "heat-carrying" fluid.

The transfer of fluid to the surface has been dealt with. When the external temperature is raised, dilatation of the peripheral vessels does occur, and thus a greater volume of fluid is brought close to the dispensing surface. External heat causes a reflex dilatation of the large subcutaneous vessels and the arterioles. The effect on the minute or endothelial vessels is two-fold. Heat acts upon them directly, giving constriction, and indirectly, through release of vaso-dilator substances giving dilatation. Of the two conflicting reactions, the indirect one is normally predominant, and vaso dilatation of the minute cutaneous vessels occurs in response to heat. For a comprehensive study of the vascular reactions see Lewis, "Blood Vessels of the Human Skin and Their Responses."

The blood is diluted on exposure to heat owing to increase in the fluid component. The vasomotor changes seems to necessitate this alteration in volume. Evaporation would also affect the fluid interchange. The additional fluid may be obtained through a number of different channels: (1) From subcutaneous tissues. (2) From the muscles. (3) By diminution of brain volume. (4) By secretion of a more concentrated urine. (5) Possibly from the intestinal tract.

In addition to these factors mentioned, the *rate* at which the blood is brought to the site of heat elimination will have an influence on heat loss. In-

crease of 20 to 50% in circulation rate may occur on exposure to a temperature of 40 degrees C. Another way in which heat loss could be facilitated is through increased pulmonary ventilation. Under ordinary conditions, however, unless *hyperthermia* is produced, there is no evidence that in man exposure to heat increases respirations of the shallow type adapted for cooling. When the body temperature is raised, then the rates of the physiological processes are increased, and some of these, such as respiration, may aid in heat elimination.

We have considered the important physical factors concerned in heat loss. On exposure to cold heat conservation is necessary, and some of the changes described in heat loss are reversed in effect—for example, the blood is concentrated, cutaneous vessels are constricted, and loss from the surface is diminished thereby. Haldane indicated that the deciding factor in determining the rate of circulation and local distribution of blood flow is the diffusion pressures of the substances which are involved in tissue metabolism, and he suggests that temperature may have its effect on circulation and distribution through its influence on the diffusion pressures of these substances.

We should consider the incidence of fever and certain pathological conditions in their relation to the breakdown of the regulatory process, but such a broad field as this demands separate treatment.

We have considered the importance, development and factors involved in heat regulation. We may sum up these main factors as showing what compensatory reactions operate when the organism is exposed to external heat and what happens when exposed to external cold. On exposure to either heat or cold, the peripheral sense endings are stimulated, impulses pass via the afferent nerves to the centre, and thence, by the efferents, to the various effectors. These responses are co-ordinated by the centre, which may also be stimulated directly by a suffi-

cient change in body temperature. External heat occasions reactions which facilitate loss of heat from the body. They are as follows: (1) The peripheral blood vessels dilate; (2) the blood is diluted by increase in volume of its fluid; (3) circulation rate is increased; (4) respiration rate rises; (5) sweating occurs. Thus, loss of heat is aided and a rise in body temperature is hindered. On exposure to cold: (1) the peripheral vessels constrict; (2) the blood is concentrated by removal of fluid; (3) if the temperature falls suffi-

ciently, metabolism increases—this increase being brought about through the liberation of hormones and by shivering, both of which mechanisms are under nervous control. Voluntary activity also plays a part. By these means loss of heat is diminished, production is increased, and the body temperature is kept at a relatively high and constant level.

### General References.

1. Martin, Sir C. J.—Lancet, Vol. 219, 1930, p. 5585.
2. Bazett, H. C.—Physiological Reviews, 1927, vii., p. 531.
3. Barbour, H. G.—Physiological Reviews, 1921, i, p. 295.
4. Pembrey, M. S.—Schafer's Textbook of Physiology, 1898.

### DR. MARRIAN.

The appointment has been announced this year of Dr. G. F. Marrian, D.Sc., F.I.C., as Associate Professor of Biochemistry, occupying the position formerly held by Dr. H. D. Kay. Dr. Marrian comes to us from the University of London, where he has won great distinction with his work on Oestrin, which he will continue here. The Academy of Medicine and the Physiology Journal Club have both recently heard excellent papers on this subject by Dr. Marrian, and we hope that some of his knowledge will be soon reflected in these pages. May we congratulate the Department of Biochemistry for obtaining for the University of Toronto the services of such a brilliant scientist.

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# RHEUMATIC FEVER\*

By L. N. PEARLMAN, '34.

A striking feature prominent in the current literature on Rheumatic Fever was the hearty disagreement noted among the various authorities on many phases of the disease. In view of the high incidence of Rheumatic Fever this may well be considered a tragic state of affairs particularly when so many Rheumatic cases show evidence of resulting cardiac disease: It need scarce be pointed out that heart disease is one of Death's favorite vehicles.

## Incidence.

The importance of this condition can be made more vivid by even a cursory examination of statistics showing its incidence. It is surprising to learn that Norway, Denmark and Iceland (in which countries Rheumatic Fever is a notifiable disease) report acute Rheumatic Fever to be present in 1% to 1.5% of the population; in Canada, where notification is not required, it is estimated at 2½% of the population.

**Age.**—The age incidence of Rheumatic Fever varies in different parts of the world. Thus a recent survey in New York City shows Rheumatic Fever to be most common in the second, third and fourth decades of life. Canadian authorities, on the other hand, hold that the peak of incidence occurs in the seventh to ninth years.

**Sex.**—Disagreement is not confined to age incidence. Sex incidence also provides fertile ground for debate. Some statisticians clearly state that the incidence in males is higher than in females. They attribute this to exposure to adverse weather, hard physical labour and physical exhaustion. On the other hand, other authorities, while admitting that the arthritic

manifestation occurs predominantly in the male, point out that Rheumatic Fever is more common in females because mitral stenosis is so prevalent among the latter. Still others correlate the two findings by claiming that in childhood, girls are more commonly affected whereas in adult life the reverse holds true.

Certain similarities in the pathological pictures found in Rheumatic Fever, Tuberculosis and Syphilis have given rise to debate which hovers around the question, "Is there a diathesis to the disease?"

It is true that Rheumatic Fever tends to occur in families, but it is not likely that heredity is a factor. Arguing against heredity, Reginald Miller asks, "Does a Diathesis, for instance, show a class incidence as juvenile Rheumatism does? Again, we must bear in mind the Poor Law residential schools. Here thousands of children from the Rheumatic stratum of the population (i.e., the poorer classes) in urban districts, in whom there is not the slightest doubt that dozens of cases of Rheumatism would have developed had they been left in their own homes, live year in and year out without a case appearing amongst them. How does this happen? Have they left their diathesis at home?"

Other authorities, too, are inclined to Miller's view that heredity plays no part in Rheumatic fever, but rather that any proclivity to the disease can be explained solely on the basis of unhealthy environment.

## Etiology.

On this phase of the subject, many ideas and theories have been put forward. As far back as 1885, a bacillus was blamed for being the causative agent of Rheumatic Fever. Twelve years later, Rheumatic Fever was attributed to a bacillus which was cer-

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tainly bigger but unfortunately was no better than the original.

Then came the streptococcus era. In 1900, the list of possible causative organisms was added to by the description of the "Diplococcus Rheumaticus." This was considered, by the discoverers, Poynton and Paine, to be the specific infecting agent. It had been recovered, in a limited number of cases, from heart's blood and other body fluids as well as from Rheumatic lesions.

It is held that this streptodiplococcus is a very delicate organism in that it dies soon after it reaches the tissues and hence must be looked for at a certain stage of the disease. A faultless technique is also necessary to obtain the organism. But despite the most ideal conditions and irreproachable technique the fact still remains that the organism is more frequently absent than present. Indeed, Carey Coombs who strongly favours Poynton and Paine's micrococcus, admits that he saw it recovered from only five cases of Rheumatic fever. He argues, however, that in those cases in which the organism was not found, no other organism was found either.

More recently, Small found another "specific" organism — Streptococcus cardioarthritidis. An anti-serum has been developed from this bacterium. Unfortunately for this discovery, however, anti-sera have been developed from other organisms too.

The whole subject of "specific" streptococci as being the etiological factors in Rheumatic fever may be summed up by the following quotation from Leonard Findlay's recent book, "... hardly any two workers have found the same organism. The organisms have been for the most part non-haemolytic streptococci, but they have varied much in their cultural and immunological reactions. And furthermore, the cardiac disease produced in the animal by inoculation with these organisms has been in the majority of instances more akin to bacterial or ul-

cerative endocarditis than to that met with in Rheumatism."

Several other theories as to the etiology have also been put forward. A virus has been suggested and even a protozoon has been blamed. The latest theory, however, is that of allergy to streptococci or their products. This hypersensitiveness results either from repeated low grade infections or from the persistence of foci of infection in the body. Under suitable circumstances streptococci or their products are disseminated to the tissues, which, being hypersensitive, over-react and produce the clinical picture. Sensitiveness to "heterogenous" streptococci or their nucleo-proteins is thus the essential to the manifestation of the disease. This theory would explain the frequent negative cultures obtained from Rheumatic fever cases and also the variety of streptococci which are present when they can be found in these cases.

It has been shown, experimentally and clinically, that exposure to both damp and cold plays a prominent part in inducing the infection to make itself manifest. It has been noted, too, that constipation plays some role in this regard. Hence, a very large capillary area is interfered with. Thus, coupled with the infection is a disturbance in the circulatory system. This disturbance possibly accounts, in part, for the pathological picture.

### Pathology.

In this latter, there is said to be an early exudative reaction followed by a proliferative one. Both of these involve the capillaries. For example, in the subcutaneous nodule, which is a characteristic lesion of Rheumatic Fever the exudate is so prominent that a nodule which feels large in situ through the skin, on biopsy loses its mass through escape of the oedematous fluid: The microscope only can then reveal it as a definite structure. In these cases, all that can be seen is a

perivascular exudate of a few polymorphonuclear leucocytes.

As the disease progresses, the proliferative element enters in the form of a low grade inflammatory reaction. This consists of a central blood vessel, which may or may not be thrombosed, but which shows proliferation of its endothelial intima. Around the vessel is a peripheral accumulation of fibroblasts and lymphocytes.

A similar picture is found in the joints. Typically, these will swell due to an inflammation of the synovial membrane and surrounding tissues with effusion into the cavity of the joint. This effusion varies from glairy straw-coloured mucoid fluid to that of frank pus—depending on the proportion of contained cellular elements which are practically all polymorphs. Nodules of a proliferative type—similar to those found subcutaneously, are found in the joint capsule, synovial membrane and periarticular tissues.

The fibrous nodule found in the heart is also essentially of the same pattern. The nodule is found in close association with the Aschoff cells. These giant cells are regarded as being derived from the vascular endothelium.

The pathology of chorea, vague as it is, nevertheless also shows a perivascular exudate of leucocytes, together with thrombosis of vessels, areas of necrosis and chromatolysis of nerve cells in the basal ganglia.

Then again, the Rheumatic involvement of peripheral vessels, as shown by Prof. Klotz and others, has led Swift to make the statement that Rheumatic Fever may be characterized as one of the vascular system.

However, although the initial onset may be considered to be one of disturbed blood vessels, the later pathological picture is evidently one of a low grade inflammation. A similar granulomatous reaction, according to Swift and his school, occurs in Tuberculosis and Syphilis. In these two diseases the reaction has been definitely

shown to be an "allergic response on the part of the tissues." Various points of similarity between Tuberculosis and Syphilis and Rheumatic Fever go to confirm the hypothesis that Rheumatic Fever is likewise an allergic phenomenon.

Apart from the experimental evidence in favour of this likelihood, certain clinical generalizations add to the proof. Thus, in both Rheumatic Fever and Tuberculosis lesions in the walls of serous cavities and joints produce serofibrinous exudates. Then again Rheumatic Fever and Syphilis resemble each other in that both tend to involve blood vessels, including the heart. Finally, Rheumatic Fever is said to resemble Tuberculosis because of its tendency to occur in families.

### Diagnosis.

As a possible aid to the early diagnosis of the disease, Brooks and O'Regan of New York recently followed a series of 700 cases in which they sought for early manifestations of Rheumatic Fever. They found that the first symptom was preponderatingly "catarrhal inflammatory processes of the upper respiratory tract." To distinguish this from the common cold, they pointed out that almost invariably the onset was accompanied by a fever which occasionally was very high.

Tonsillitis and Pharyngitis were found to be almost equal in their prominence as first symptoms. They were surprised to find, however, that adenitis appeared very early in many cases. The glands most frequently affected were those at the angle of the jaw. The adenitis was often widespread and frequently occurred before the involvement of those nodes which drained the affected extremities. In a few cases, acute lymphatic leucaemia was thought to be developing because of the rapidity with which the glands increased in size while at the same time a lymphocytosis was observed in the blood.

Another constant feature observed in this study was the early onset of a low grade fever. Unless the heart was

involved, the pulse rate, too, was increased.

Polyarticular arthritis was present at the period of onset or shortly afterwards in 90% of cases and occasionally was the very first manifestation. Finally, in the matter of carditis, 25% of cases in New York presented themselves with initial complaints explainable only on the basis of cardiac disease. Further, these New York workers concluded that cardiac involvement was exceedingly common and perhaps constant. This bears out Swift's contention when he claims to have found alterations in the electrocardiograms of 90% of all Rheumatic Fever patients—thus indicating myocardial change.

### Clinical Manifestations.

The above described prodromal symptoms of Rheumatic Fever may be used in diagnosing the disease before it has made itself manifest in its more developed forms. Of these latter, four main types are described, (i) in which the cardiac involvement is the outstanding feature, (ii) in which the arthritic phenomenon forms the striking manifestation of the disease, (iii) the nervous or choreic type, (iv) the skin lesions.

The cardiac phase of Rheumatic Fever has been set aside to be dealt with in some detail in a following paper.

### Joints.

Rheumatic arthritis involves the large joints of the body particularly. The joints are not only painful to move, but are painful to touch. On occasion, reddening of the surrounding tissue and swelling may be observed. As may be conjectured from the pathological picture this swelling varies—it may be firm and elastic or soft and fluctuating.

Typically, the arthritis is polyarticular and flits from one joint to another. The one joint, however, may still be involved when the others are

first affected. With so characteristic a feature one might imagine the problem of diagnosis to be a simple one. However, particularly if there are no cardiac manifestations, this may be mistaken for the early stages of Rheumatoid arthritis or rather the latter is more likely to be mistaken for a Rheumatic Arthritis. The following history may serve to illustrate this point:

The patient in this particular instance was a girl now 17 years of age. About three years previous to her last admission, she complained of stiffness and pain in the left wrist. In addition, pain developed in the left shoulder, left knee and left ankle. In short, she gave a history of a flitting polyarthritides. Within six weeks she was completely recovered—with full range of movement in all the affected joints. Two similar attacks followed within the next two years. In the last of these, however, only the left wrist and left ankle were involved. A diagnosis of Rheumatic Fever was made each time.

Last Christmas again, the patient complained of a stiff left wrist only. This time the diagnosis was that of Infectious Arthritis.

It is now evident that the original polyarticular attacks were not Rheumatic, but rather Rheumatoid, as the latter may manifest itself in the manner described above. It is occasionally quite impossible to determine whether the arthritis is Rheumatic or Rheumatoid, particularly if the attack is the first one, a short one, leaves the joint without obvious damage and no indication of cardiac involvement is present. The element of time enters into the diagnosis since eventually the Rheumatoid arthritis ends up with an injured joint.

Suppurating and infectious joints, e.g., gonorrheal arthritis also leave a permanently damaged member. Gout and osteomyelitis also play parts in the differential diagnosis.

In addition, acute Tuberculous polyarthritides enters into the problem.

Fortunately, it is a rare condition, but nevertheless, Findlay quotes a case in which the correct diagnosis was made at autopsy. Another case, too, is quoted in which a luetic infection nicely confused the diagnostician.

An interesting error is revealed in a case of Rheumatic Fever involving the hip joint. This was diagnosed as an intra-abdominal lesion!

It must be evident from the foregoing that an immediate diagnosis may present certain difficulties.

### Nervous System.

The involvement of the nervous system by Rheumatic Fever forms another interesting aspect of the disease. Strange as it now may seem to be, it took 300 years for chorea to be recognized as a manifestation of Rheumatic Fever.

Not very much light has been thrown on chorea despite certain studies of the subject. As has been previously pointed out, the site of the lesion is usually considered to be in the Basal Ganglia. There is evidence, however, that changes in the body of Luys account for the symptoms.

Fright and strain play very little if any part in bringing on the disease. This is evidenced by the fact that the incidence of chorea in England actually decreased during the war.

But be that as it may, there are various features of this condition which are of interest. To refer back, for a moment, to Rheumatic arthritis, the patient as a result of his arthritis naturally reduces his movements to a minimum. It may here be noted that arthritis rarely accompanies the chorea of Rheumatic Fever. Nature thus shows some consideration for the comfort of the choreic. It is hardly necessary to point out what suffering such a patient would undergo were arthritis superimposed on the involuntary, jerky, purposeless movements which accompany the former condition.

Chorea of Rheumatic origin (Sydenham's Chorea; St. Vitus Dance, etc.) is a disease of early childhood. Fre-

quently it is ushered in by the child becoming restless, fidgety and "butter-fingered." This nervousness does not indicate a proclivity to the disease, but rather is an early manifestation. To quote Reginald Miller again, "I used to be taught that nervous children were particularly prone to Rheumatism. I am sure this is the wrong way round. A child does not become Rheumatic because it is nervous, it becomes nervous because it is Rheumatic."

The patient with chorea in its characteristic form exhibits his movements only while he is awake. The movements have been described as "objectively purposeless, but subjectively purposeful." There is, however, such evidence of inco-ordination and lack of harmonious movement between groups of muscles as simultaneous contractions of diaphragm and rectus abdominis.

The movements are spontaneous, sudden in onset and sudden in cessation. They may be generalized or involving only one area, e.g., a limb or the face. Variation in severity also occurs, thus the movements may be quite harmless—merely twitchings—or they may be so violent that the patient must be guarded with pillows so as to avoid injury to himself. Sometimes speech is impossible and the breathing and deglutition is interfered with. As a result feeding may be a difficult job. Excitement and attempts at voluntary movement always intensify the movements. Maximum movements occur in 10-14 days. (It is at this time that the pillows may be required). Occasionally, a paresis may occur. This, however, is always temporary.

Reflexes are increased and sustained for an undue length of time. Nothing abnormal is to be found in the cerebro-spinal fluid. In uncomplicated chorea the temperature, too, is normal. If fever is present other causes must be sought for, e.g., cardiac complications.

### Skin.

Passing now to the principle skin manifestation, the subcutaneous nodule,

it might be well to point out that for some unknown reason these are rare in this country. In England, however, they are quite common. The nodule is found over bony prominences, e.g., occiput, elbows, vertebrae, etc. In addition, the tendons of the back of the hand and the Tendo Achilles are possible sites.

Miliary nodes—also subcutaneous—which cannot be seen but are felt in soft tissues and over the vertebral prominences are claimed by two clinicians to be present in every case of Rheumatic Fever if only they are sought for diligently. According to local practitioners, however, these miliary nodes are never found here.

### Treatment.

With respect to treatment, the salicylates are regarded with the utmost favour in all forms of the disease. Twenty grains Sodium Salicylate together with an equal dose of an alkali such as Potassium Bicarbonate are given q. 3. h. As soon as signs of overdosage occur, this medication is, of course, stopped. With Rheumatic Arthritis, local applications of methyl salicylate are recommended.

It is doubtful if the Salicylates have any curative value in this disease, but they undoubtedly relieve the symptoms. Indeed, they are sometimes used as a means of differentiating Rheumatic Fever from other infections since they produce such striking changes with the former. Other drugs such as neocincophen have been used with equally good results.

Unfortunately, Salicylates taken per os may be irritating to the stomach. It has, therefore, been suggested that sodium salicylate be administered per rectum. A more recent suggestion, however, has come from a British children's hospital. In this institution cases of chorea were treated by immersion in baths at skin temperature for half hour periods. During this time the child was not permitted to exert himself in any way. Beneficial effects were obtained, but these were slower in mak-

ing their appearance than when salicylates were used.

### Prophylaxis.

Prophylactic treatment must be considered in Rheumatic infection. This consists mainly in clearing up all known foci of infection—good results have been obtained by the removal of infected tonsils. Indeed, the statement has been made that the tonsil is the only known portal of entry of the infection and should therefore be taken out. Tonsillectomy, however, by no means produces 100% results.

In any event, the patient must be in the best possible condition prior to the operation. Even then cases have been reported where tonsillectomy has brought on very vicious flare-ups of Rheumatic Fever. No explanation has been offered for this.

### Summary.

1. The etiology of Rheumatic Fever is very doubtful, but there is a growing inclination towards the non-specific streptococcus allergy hypothesis.

2. There is no hereditary diathesis to the disease.

3. There is no definite agreement as to age and sex incidence. There is a likelihood, however, that this varies in different parts of the world. The general incidence of the disease is at least 1% of the population.

4. The pathology of the condition is essentially one involving the vascular system.

5. Upper respiratory tract infections are frequently prodromal indications of Rheumatic Fever.

6. Polyarthritides is also an early and almost constant manifestation, but may offer considerable difficulty in differentiation from Rheumatoid arthritis.

7. The heart is probably almost constantly involved.

8. Chorea is a manifestation of Rheumatic infection.

9. Subcutaneous nodules are rarely and miliary nodes are never found in this country.

10. There is no cure for Rheumatic Fever. Salicylates are beneficial, but they do not cure the condition. Tonsillectomy is advisable as a prophylactic measure, but is not invariably successful.

An expression of thanks is due Professor Holman and Dr. Blaisdell for their helpful discussion and material.

# CONSTITUTION OF THE UNIVERSITY OF TORONTO MEDICAL SOCIETY\*

## ARTICLE I.—NAME AND OBJECTS.

1. This Society shall be named "The University of Toronto Medical Society."

2. The object of this Society shall be to deal with all matters pertaining to the general interest and welfare of the Medical Students, especially:

(a) To encourage interest in general medical science and literature, and in the pursuit of medical studies.

(b) To maintain a reading and smoking room, and supply periodicals, medical literature, music, piano, telephone and everything and anything which may add to the comfort and convenience of the Undergraduates in Medicine.

(c) To be a means of communication between the student body and the Faculty or any other body, when such communication is desirable.

(d) To publish a current monthly journal of seven issues during the college year, such journal to be known as "The University of Toronto Medical Journal."

(e) To maintain a benefit fund for students suffering from illness during the college year, such fund to be known as the "Medical Sick Benefit Fund."

## ARTICLE II.—MEMBERSHIP.

1. The members of the Society shall be:

(a) Honorary; (b) Life; (c) Ordinary.

2. The Honorary Members shall be:

(a) All ex-Honorary Presidents and ex-Honorary Treasurers of the Society.

(b) Such persons as may be chosen by a vote of five-sixths of the members present, at any regular meeting of the Society.

(c) The Life Members shall be all graduates in medicine of the University of Toronto, who shall have paid their membership fee during the five or six years of study.

(d) Ordinary Members shall be all students registered in medicine in the University of Toronto, and who shall have paid the Annual Membership Fee as hereinafter provided.

## ARTICLE III.—OFFICERS.

1. The Officers composing the Executive of the Society shall be of five classes:

(a) Honorary.

\*The Revision of the Constitution of the Medical Society of the University of Toronto, adopted by the Medical Society, April, 1933.

Committee of Revision—F. G. S. Christie, J. W. Graham, F. P. McInnis, F. B. Plewes.

(b) Those elected by the members of the whole Society.

(c) Those elected by members of the Society in each respective year.

(d) The Medical Athletic Society shall be a subsidiary Society of the Medical Society and a separate entity, and the President of the Medical Athletic Society shall be a voting member of the Medical Society Executive.

(e) Those appointed by the Executive.

2. The officers of each respective year elected by each respective year shall be:

(a) President.

(b) Vice-President.

(c) Treasurer.

(d) Secretary.

(e) A Representative to the Executive of the Medical Athletic Association in the first three years.

3. The Honorary officers of the Society shall be:

(a) An Honorary President—who shall be the Dean of the Faculty of Medicine.

(b) An Honorary Treasurer, who shall be chosen by the Executive from among the members of the Professorial Staff, at the first meeting of the Executive.

4. The officers of the Society elected by members of the whole Society shall be:

(a) A President, chosen from those entering the Graduating year.

(b) A Vice-President, chosen from those entering the Fifth Year.

(c) A Secretary-Treasurer chosen from those entering the Fourth Year.

(d) An Assistant Secretary-Treasurer chosen from those entering the Third Year.

5. The officers of the Society elected by members of the Society in each individual year shall be Six Councillors. The elected Presidents of the Sixth, Fifth, Fourth, Third, Second and First Years.

6. The officers named in Sections 3, 4 and 5 shall comprise the Medical Society Executive, and only these shall have the power to vote on Executive business.

## ARTICLE IV.—DUTIES OF OFFICERS.

1. It shall be the privilege of the Honorary President to preside at any or all of the meetings of the Society.

2. The Honorary Treasurer shall be the custodian of the books and funds of this Society from session to session during vacation.

3. It shall be the duty of the President:

(a) In the absence of the Honorary President to preside at all meetings of the Society or the Executive.

(b) To conduct the order of business of such meetings as hereinafter provided.

(c) To decide points of order.

(d) To announce the result of all voting.

(e) To give the casting vote in case of a tie.

(f) And to perform such other duties as are ordinarily performed by the President of any society.

(g) The President shall also call meetings when he deems fit, or if requested by three members of the Executive to do so. He shall also receive all property of the Society from the other officers at the final meeting of the Executive, and shall hand all such property to the Honorary Treasurer for safe keeping, except as may otherwise be ordered by the Executive. The President shall also be an ex-officio member of all committees.

(h) The President shall act as Chairman of the Medical Sick Benefit Fund Committee and Chairman of the Special Finance Committee.

4. It shall be the duty of the Vice-President:

(a) In the absence of the President the Vice-President shall assume the duties ordinarily performed by the President.

(b) He shall be Chairman of "At-Home" Committee.

5. The Secretary-Treasurer shall keep full and correct minutes of the proceedings of all meetings of the Society. Keep a record of all names of candidates for Honorary membership proposed and elected. He shall also conduct all outside correspondence as directed by the Executive. He shall also receive all correspondence addressed to this Society and present the same at the proper order of business, as hereinafter provided.

He shall also keep a record of all votes cast at every election or division, and shall be responsible for accuracy of the same. He shall also prepare, sign and post notices of all meetings of the Society. He shall be the custodian of the Secretary-Treasurer's books during his term of office, and shall surrender the same at the end of his term to the President for the Society. He shall keep a copy of each edition of the Constitution of the Society, and all other publications of historical value; he shall write a historical sketch of the Society during his term of office, and shall enter the same in a book kept for the purpose.

It shall be the duty of the Secretary-Treasurer to receive and hold membership fees, and all other monies belonging to the Society during his term of office. He shall pay all accounts, when so ordered by the Executive and not otherwise, and

all cheques must be countersigned by the President. He shall also keep a correct account of all receipts and expenditures of the Society. He shall also keep all receipted accounts, vouchers, etc., for the inspection of the bursar. He shall also keep a membership book in which shall be entered the names of all Ordinary members of the Society, and each and every payment of fees. He shall produce all papers, and books at the pleasure of the Executive, and shall comply with the University as regards auditing of books, and at the final meeting of the Executive in his term of office, shall surrender to the President all monies, books, accounts, receipts, or any other property of the Society which may be in his possession.

6. The Assistant Secretary-Treasurer shall assist the Secretary-Treasurer in the discharge of his duties as set forth in Article 4, Section 5. He shall also act as the Secretary-Treasurer of the special "Medical Sick Benefit Fund Committee" as hereinafter provided.

7. The Councillors shall aid in the despatch of business, and protect as far as possible the property of the Society. They comprise the Senior Medical At-Home Committee.

8. The President, Vice-President, Secretary-Treasurer, and Athletic Representative of each year shall constitute the Executive of that year, and shall manage and conduct business pertaining to that year, each officer performing the duties ordinarily performed by corresponding officers of any organization.

This Executive shall be responsible to the Executive of the Medical Society for the proper conduct of class affairs.

## ARTICLE V.—ELECTIONS.

### 1. Nominations:

1. Nominations for the officers hereinafter enumerated shall be received at meetings of the respective years to be held not later than the third Friday in February of each year.

"Speech Night" may be held the following Monday at 5 p.m. in the Medical Building, if possible. Nominations shall be formally received and further nominations shall be in order. All Medical and Athletic Society candidates shall be expected to speak.

The order of receiving nominations shall be:

(a) President, Vice-President, Secretary-Treasurer and Assistant Secretary-Treasurer of the Medical Society.

(b) President, Vice-President, Secretary and Treasurer of the incoming 6th, 5th, 4th, 3rd and 2nd years respectively.

All nominations must be in writing, signed by the original nominator and deposited with the Secretary-Treasurer at following Monday.

Violations of the above mentioned procedure shall be valid only when due to holidays or to other unavoidable circumstances.

## 2. Withdrawals:

(a) Notice of withdrawal must be in writing and deposited with the Secretary-Treasurer before two o'clock p.m. of the Tuesday following the nominations. Such withdrawals shall require the signature of nominator.

(b) Names of candidates shall be arranged on ballots in alphabetical order.

## 3. Eligibility.

(a) All Ordinary Members of the Society, who have paid their fee.

(b) Life Members on payment of the membership fee for the current year, shall be entitled to vote at all or any elections held by this Society.

(c) NO VOTING BY PROXY SHALL BE ALLOWED.

## 4. Actual Elections:

The elections shall be held on the following Friday at an hour and place to be decided upon by the Executive.

A majority of the total number of votes cast shall be necessary for election to any office. The Hare-Spence system of voting shall be used. In the Hare-Spence system of voting the voter marks opposite the name of the candidate for whom he wishes to vote, the figure 1, while opposite his second choice for this office, he marks the figure 2, and opposite his third choice the figure 3, and so on.

When the number of "first choices" are added, the candidate with the lowest number goes out, and his "second choices" are distributed among the others, counting as firsts. This method of elimination is followed until two are left, and the candidate with the largest count is declared elected.

### (a) OFFICIALS.

(1) The President of the Society shall have charge of and conduct polls and shall be known as Division Returning Officer. In case of unavoidable absence from the poll during the polling hours, he may appoint to act in his stead a Deputy Returning Officer, who shall be a member of the Executive not running for office.

(2) The Secretary-Treasurer, or in his absence, a substitute approved by the Returning Officer, shall act as Poll Clerk.

(3) The President and Secretary of each year or their deputies shall act as Returning Officers and Poll Clerks respectively for their respective years.

### (b) PRELIMINARY PROCEEDINGS.

Ballot boxes shall be provided similar to those authorized in Elections for the

House of Commons as follows: One for each year, one for the Executive of the Society and one for the Executive of the Medical Athletic Association.

### (c) ACTUAL CONDUCT.

(1) Immediately before the opening of the poll, the Returning Officer or Deputy Returning Officer shall in the presence of Poll Clerk and candidates, count the ballots to be used. He shall open the ballot box and give to the candidates an opportunity to ascertain that the box is empty; he shall then close and seal it. He shall then declare the poll open.

(2) When a voter offers to vote, the Returning Officer shall first ascertain if his name is on the list of members entitled to vote, kept by the Secretary-Treasurer; if the voter affirms that he is an ordinary member, his name shall be entered on the Secretary's list. Satisfying himself that the name is on the list, he shall, if no objection is offered to the voter voting, put his initials upon the ballot and hand it to the voter, the voter being entitled to refuse it if not initialled.

(3) If objection is offered, the Returning Officer, or Deputy Returning Officer shall require the voter to make affirmation that he has received no consideration for his vote, and that he is the man he purports to be. The voter, if he refuses to make any such affirmation, shall be refused a ballot; if he affirms he shall be allowed a vote.

(4) The Poll Clerk shall record the names of all offering to vote, and all objections offered, and shall mark after the names of the voter, affirmed, refusing to affirm, or voted, as the case may be.

(5) Any voter who inadvertently marks, tears, or in any way spoils his ballot, shall, on returning it, receive another. The spoiled ballot shall be kept by the Poll Clerk.

(6) No voter shall be allowed to take a ballot from the polling booth.

(7) The Returning Officers or Deputy Returning Officers, the Poll Clerks, the Secretary-Treasurer, with an assistant if necessary, and those actually engaged in voting, and no others, shall be allowed within the polling booth.

### (d) COUNTING THE BALLOTS.

(1) As soon as the Returning Officer or Deputy Returning Officer, has declared the poll closed, he shall count the ballots remaining unused, and the spoiled ballots, and shall open the ballot box and count in the presence of the Poll Clerk and Scrutineers, the ballots used.

(2) He shall then examine the ballots, rejecting those that do not bear his initials, or which bear any marks by which they might be distinguished.

(3) He shall then count the ballots cast for each of the candidates, and shall immediately post up the results on the Bulletin Board in T.G.H. and Medical Building, declaring elected the candidate for each office, who has the largest number of votes for that office.

(4) The rejected, spoiled, used and unused ballots shall be kept in envelopes by the Poll Clerk.

(5) In the event of equal numbers of votes being cast for the candidates for any office, the Returning Officer shall give a deciding vote. In no other case shall he vote.

(6) An official count shall be kept by the Secretary-Treasurer and the result of the poll, together with the number of votes cast for each candidate, must be entered in the Minute Book of the Society.

(7) Each candidate may appoint a scrutineer who shall be present at the counting of the ballots.

#### (e) RECOUNTS, ETC.

(1) In the event of any officer being elected by a majority not greater than ten (10), the defeated candidate may demand a recount; the demand must be in writing and handed to the Secretary-Treasurer within three days of the elections.

(2) In case of an apparent injustice, any candidate may enter a protest, such protest must be handed to the Secretary-Treasurer within a week of the elections, and must be in writing and must specify the ground of complaint. The Executive shall then take such action as they may deem advisable.

#### ARTICLE VI.—VACANCIES.

1. If any officer be absent from any meeting of the Executive, the President may appoint a substitute pro tem from amongst the other members of the Executive.

2. If any member of the Executive be absent from two consecutive meetings, the Secretary-Treasurer shall notify him in writing, and if he be absent at the third consecutive meeting, the President shall declare the office vacant, unless such member shall be able to produce satisfactory reasons for absence.

3. If any officer tenders his resignation, such resignation may be accepted by a two-thirds vote of the members present at any meeting of the Executive.

4. In case of any office becoming vacant by the resignation of any officer, or for any other reason whatsoever, the President shall call for nominations to fill such vacancy within one week after receiving notice of said vacancy, and if more than one name be proposed, a poll shall be held one week after the day of the nomination.

#### ARTICLE VII.—DUTIES OF THE EXECUTIVE.

1. The Executive shall have charge of the general business and finances of the Society, and shall conduct the same in the best interests of the student body.

2. They shall make appointments for and conduct all meetings of the Society, and shall be responsible for the propriety of all subjects discussed at such meetings.

3. They shall call general meetings throughout the term, and shall provide suitable programmes for the same.

4. They shall, if necessary, appoint special committees of not less than three members, such committees to continue in office until discharged by the vote of the Executive. The member first named shall be the Chairman of the Committee. The reports of such committees are to be recorded in the general Minute Book of the Society; a majority of such committees shall constitute a quorum.

5. The Executive shall meet once a week on a day to be decided on by the Executive in power, early in the fall term.

6. At the first meeting in October, the Executive shall appoint the representative to the reportorial board of the 'Varsity.

7. Five members of the Executive shall constitute a quorum.

8. The Executive shall appoint the Chairman, Secretary and Treasurer of the Daffydil Committee, shall control the policy of said committee, and shall be responsible for any debts or liabilities incurred by the above-mentioned committee, provided the said committee follows the Daffydil Constitution.

9. The Executive shall be responsible for the maintenance of the Medical Sick Benefit Fund as hereinafter provided.

10. The Executive shall be responsible for the publishing of the University of Toronto Medical Journal as hereinafter provided.

#### ARTICLE VIII.—AT HOME COMMITTEE.

1. The At-Home Committee shall be constituted as follows:

(a) Honorary Chairman, who shall be the Dean of the Medical Faculty.

(b) A Chairman, who shall be Vice-President of the Society.

(c) A Secretary-Treasurer, who shall be President of the Fifth Year.

(d) The four remaining Presidents of the respective years.

2. The At-Home Committee shall be responsible for all social functions of the Society. All funds shall be under the name of the At-Home Committee of the Medical Society and all payments made by cheque over the name of the Chairman and Secretary-Treasurer. At the end of

the current session, the Chairman and Secretary-Treasurer shall present a signed financial statement to the Medical Society for its ratification. The Medical Society shall assume responsibility for all liabilities or profits of this Committee, provided said Committee follows the Constitution.

3. The Representatives of the Medical Society to Sister Institutions from whom invitations have been received shall be:

(a) The Members of the Medical Society Executive in expressed preference in the following order of seniority, until all members have had an opportunity of attending one function. Then a second choice in same order of seniority.

1. The President.
2. The President of the Medical Athletic Association.
3. Graduating Year Councillor.
4. Vice-President.
5. Fifth Year Councillor.
6. Secretary-Treasurer.
7. Fourth Year Councillor.
8. Assistant Secretary-Treasurer.
9. Third Year Councillor.
10. Second Year Councillor.
11. First Year Councillor.
12. Editor of Journal.
13. Chairman of Daffydil.

(b) An itemized account of expenditures of such a representative shall be presented at next meeting of Executive and paid by Society only after being scrutinized and satisfactorily passed.

4. The President, Vice-President, Treasurer, Secretary, and Athletic Rep. of the first year, shall be elected from the first year at such time as the President may deem fit, but not later than October 15th. Nominations for the elections of such officers shall take place in the open class meeting and shall be presided over by the President of the Medical Society or his Representative.

#### ARTICLE IX.—MEETINGS.

1. The meetings shall be either "general or open" for all members and an "Executive" for all members of the Executive.

2. General meetings of the Society shall be held at frequent intervals from October to March.

3. The annual meeting of the Society shall be held not later than the third Friday of April in each year, and at such meeting the annual report of the Treasurer shall be discussed.

4. The Executive shall meet at the call of the President; a final meeting shall be held previous to the annual meeting, at which meeting the Treasurer's report shall be submitted and adopted, and all property in charge of the officers shall be placed in the keeping of the President.

At such meeting, the Treasurer's statement, which is to include various committees' and journal's financial reports, shall be ordered to be presented to the Executive, at least one week prior to the annual meeting. Previous to such Executive meetings the Treasurer's books shall be audited by two ordinary members of the Society, named by the members of the Society, in company with the Secretary-Treasurer, at some previous regular meeting of such Society.

5. The Executive shall have power to decide upon any special open meetings, or entertainments, as they may deem fit for the general good of the medical student body.

#### ARTICLE X—PROPERTY OF THE SOCIETY.

1. All property and effects of the Society shall be vested in the Executive and subject to its control, with the distinct understanding that no person or persons shall ever at any time have the right to permanently remove or dispose of such property without the knowledge and consent of the Executive.

2. The name of any person or persons cutting, defacing, or destroying in any way the books, papers, magazines, or other property of the Society, or removing any such property from the reading rooms of the College, shall be reported to the Executive, and, if deemed advisable by the Executive, may be submitted to the Faculty for action.

3. There shall be no reports of any meetings of the Executive, or open meetings of this Society, without the consent of the President of the Society, and no reports of any class meetings without the consent of the President of such class having been obtained, unless the meeting or the class meeting shall by a two-thirds vote rule otherwise.

4. The Medical Magazines of this Society at the end of each term shall be collected and bound, and said volumes be placed at the disposal of the Medical students in the offices of the Society; all other magazines to be collected and distributed to charitable institutions as deemed advisable by the Executive at the end of each term.

#### ARTICLE XI—FINANCES.

1. The annual membership fee of the Society shall be \$3.00, payable to the Bursar of the University; \$1.50 of which shall be handed over to the Medical Athletic Association.

2. The Executive shall not be responsible for any debts assumed by any student or any member of the Executive unless such debt has been contracted with

the full knowledge and consent of the Executive.

3. All cheques for the payment of money shall be signed by both the President and Secretary-Treasurer, and shall be deemed invalid unless so signed.

4. Printed copies of the Secretary-Treasurer's statement shall be distributed each year, at least one week before the annual meeting.

5. All money of this Society shall be deposited under the name of the Society.

6. The Executive of the Society, at their first meeting in October, shall name a special Finance Committee to consist of the President, who shall act as Chairman of the Committee, the Secretary-Treasurer, and one other member of the Executive. It shall be the duty of this Committee to prepare a budget of proposed expenditures for the Society for the ensuing year, which, after adoption, shall be strictly adhered to by the Executive.

## ARTICLE XII—ORDER OF BUSINESS.

1. Roll-call of officers by the Secretary-Treasurer.

2. Reading and signing of the minutes of previous meeting.

3. Reports of special committees by the Chairman of such Committees and business arising from the minutes.

4. Communications read by the Secretary-Treasurer.

5. Secretary-Treasurer's report of fees received and also of expenditures.

6. Notice of Motion.

7. Unfinished business.

8. New business.

9. Miscellaneous business.

10. Motions to adjourn shall be in order at any time.

11. Adjournment.

## ARTICLE XIII—RULES OF ORDER.

1. Every member in speaking shall address the Chair, confine himself to the subject under discussion, and shall avoid personalities and unparliamentary language.

2. No member shall speak more than once upon any question, unless with the permission of the Society, except in explanation of a metrical part of his speech, which may have been misconceived, and no new matter shall be introduced upon such explanation. A reply is allowed to a member who has opened a debate or moved a substantive motion; but not to the mover of an amendment.

3. When two or more members rise at once to speak, the Chairman shall determine their precedence.

4. When a member is speaking, no

person shall interrupt, except for the purpose of calling him to order or asking a question. No irrelevant questions shall be in order.

5. A member called to order shall at once sit down, until the point is stated and determined by the Chairman, whose decision shall be given without debate, unless, being in doubt, he shall invite discussion. If such decision is appealed from the grounds of appeal, and the reasons for decision having been stated, the question shall, without debate, be put as follows: "Shall the decision of the Chair be sustained?"

6. Any member may require the question under discussion to be read at any time, but not so as to interrupt a member while speaking.

7. When a member is speaking, a motion being read, or a vote taken, no member shall walk out or across the room or make any noise. Conversation calculated to disturb any member while speaking or reading, or to hinder the transaction of business, shall be deemed a violation of order, and if persisted in shall incur censure.

8. Every motion shall be seconded before it is discussed.

9. A motion to adjourn shall be in order at any time, except when a member is speaking, during a division or election, or immediately after a motion, or the adoption of the previous question. A simple motion to adjourn shall be decided without debate.

10. The previous question shall precede, and until decided, preclude all amendments to the main motion, and all amendments already moved shall be put in the usual order, without further discussion.

11. Only one amendment to an amendment shall be in order, and no irrelevant amendments shall be permitted.

12. A motion to re-consider the decision of the Society on any question must be made by a member who voted in favour of such decision, and must be carried by a two-thirds vote of the Society.

13. When the report of any Committee has been read to the Society, it shall be deemed to be received without any motion to that effect, and may then be adopted with or without amendment, referred or laid on the table.

14. Any member may admit a visitor to any open meeting of the Society.

15. Cases not provided for in the foregoing rules shall be governed, as far as possible, by the practice of the Legislative Assembly of Ontario.

16. A two-thirds majority shall be required to overturn the ruling of the Chair.

# ARTICLE XIV—ALTERATIONS TO CONSTITUTION.

Alterations, additions or amendments to the Constitution may be made at any General Meeting of the Society, provided:

(a) That written notice of such amendments shall have been given to the Executive at least two weeks previous to such general meeting.

(b) That notice of such alterations, additions or amendments shall have been posted on the notice boards for at least one week previous to such general meeting.

(c) That a two-thirds vote of those present at such general meeting shall have been cast in favour of such alterations, additions or amendments.

# ARTICLE XV—DATE OF EFFECT.

These articles shall come into effect immediately upon their adoption by a two-thirds vote of the members present at the general meeting at which they are submitted, and receiving the consent of the Honorary President of the Society, as representative of the Faculty.

# ARTICLE XVI—APPOINTMENTS.

1. The Medical Society Executive shall appoint the following:

(a) A 'Varsity Representative.

(b) A Musical Director.

(c) A Chairman of Daffydil Committee, from either the Fifth or Sixth Year.

(d) An Editor-in-Chief of the Medical Journal, who shall preferably be the retiring Assistant Editor or former Associate Editor.

(e) An Assistant Editor chosen from applicants in the incoming Fifth Year on the recommendation of the retiring Editorial Board.

(f) A Managing Editor of the Medical Journal. This office shall be advertised annually by the Journal Editorial Board, and an applicant chosen by the Executive, acting upon the advice of the retiring Editorial Board, such applicant to be a member of the Society and appointed not later than October 1st.

(g) Any other officers to fulfil any other duties which may arise.

2. The officers above named in Articles XVI. under (c) and (d), Clause 1, shall be non-voting members on the Medical Society Executive.

# ARTICLE XVII—MEDICAL SICK BENEFIT FUND.

1. Name.

That the name of this Fund shall be Medical Sick Benefit Fund.

2. Object.

The object of this Fund shall be to render financial assistance to subscribers who have incurred expenditures owing to acute illnesses during the college term.

3. Subscribers.

Any student who is an undergraduate in the University of Toronto in the Faculty of Medicine is eligible to become a subscriber.

4. Officers.

(a) All members of the Medical Society Executive shall act in this capacity.

(b) That a special committee of five (5) members be chosen from the Medical Society Executive, two of which must be the President and the Assistant-Secretary-Treasurer of the Medical Society Executive and the remaining "three" be elected by the rest of the Medical Society Executive.

5. Regulations—New Section.

(1) The maximum payment any subscriber is entitled to claim shall be \$73.50, this amount being the equivalent of the cost of maintenance at the rate of \$3.50 per day for 21 days.

(2) No subscriber may claim more than \$3.50 per day for hospital maintenance or nursing care during the period of his or her illness.

(3) Subscribers may claim for cost of emergency treatment, such as expense of Operating Room, X-Ray and Laboratory charges.

(4) No claims for physicians', dentists' or nurses' services shall be honoured.

(5) All claims must be accompanied by physician's certificate stating the nature and duration of the illness, by receipts for the amount claimed, and Bursar's receipt of fees paid.

(6) All claims incurred from commencement of session until April 1st must be in the hands of the Assistant Secretary-Treasurer of the Medical Society not later than April 15th.

(7) No claims for the current session will be paid before April 15th.

(8) Claims for illness occurring between April 1st and the end of the term shall be placed in the hands of the Assistant Secretary-Treasurer of the Medical Society on or before November 10th of the next session, and shall be paid, if valid, as soon as possible after this date, on the same pro-rata basis as the claims of the previous year were paid.

(9) Illnesses for which claims are valid shall be defined as acute medical or surgical conditions, requiring treatment and arising during the college session.

6. Management.

(1) The Special Committee as is in

Section 4 (b) shall be empowered to deal with the general management and distribution of this fund to the proper individuals.

(2) The Medical Sick Benefit Fund shall be kept as a separate fund.

(3) All monies shall be paid by cheque, and the President and Assistant Secretary-Treasurer shall affix their signatures to each.

(4) In the event of any abnormal situation arising relative to this fund, the whole Medical Society Executive shall act after it has been referred to them by the Special Committee.

(5) The Committee shall meet as soon after November 10th as possible to consider claims specified in Section 5, Clause (8).

(6) The Committee shall meet as soon after April 15th as possible to consider claims arising during the current session.

(7) The Medical Society Executive shall be empowered to vary Section 5 (2) and (3) to suit arising conditions.

#### 7. Distribution.

(1) Valid claims for the current session shall be paid in full if the amount of the Fund be equal to or greater than the total amount of the claims, such payments to be made between April 15th and the close of the term.

(2) Should the grand total of valid claims exceed the amount in the Fund, each claim shall be paid in direct proportion to the ratio of the amount of Fund to amount of claims.

(3) The Committee shall observe Section 5, Clause (8) relating to the payment of claims for illnesses incurred between April 15th and the close of the previous session.

#### ARTICLE XVIII—CONSTITUTION OF DAFFYDIL COMMITTEE.

##### 1. Name.

This Committee shall be known as the Daffydil Committee.

##### 2. Officers.

This Committee shall be appointed in October of each year, and shall consist of:

(1) Chairman appointed by the Medical Society from either the Fifth Year or the Sixth Year.

(2) Secretary appointed by the Executive on the recommendation of the Sixth Year Executive.

(3) Treasurer appointed by the Executive on the recommendation of the Sixth Year Executive.

(4) Editor of "Epistaxis" appointed by the Medical Society on the recommendation of the Daffydil Committee.

(5) Property Manager who shall be the Assistant Property Manager of the previous year if available, otherwise appointed by the Fifth Year Executive.

(6) Assistant Property Manager appointed by the Fourth Year Executive.

(7) Seven Representatives, one appointed by each Year Executive and one by the Ladies' Medical Society, who shall be managers of their respective stunts.

(8) Stage Manager appointed by above members of the Daffydil Committee.

(9) Lantern Manager appointed by the above members of the Daffydil Committee.

#### 3. Duties.

(1) The Committee shall have full charge of Daffydil performances held during the first two weeks of February, or at such time as decided suitable by the Medical Society Executive.

(2) They shall have full charge of the publishing of "Epistaxis."

(3) The Secretary shall keep Minutes of all meetings in a book provided, and shall hand same to the Secretary of Medical Society not later than March 30th of that year.

(4) The Treasurer shall have charge of all funds, and shall submit a financial statement and balance to the Secretary of the Medical Society not later than March 30th of that year,—\$150.00 of that amount being retained by the Society for the incoming Executive.

#### ARTICLE XIX—MEDICAL JOURNAL.

##### 1. Name.

The name of this publication shall be "The University of Toronto Medical Journal."

##### 2. Objects.

The object of this journal shall be the publication of articles and works of prime interest to medical students, such articles to be contributed preferably by undergraduates, graduates, or members of the teaching staff of the Faculty of Medicine of the University of Toronto.

##### 3. Management.

(1) This journal shall be published seven times a year, at monthly intervals beginning with November 1.

(2) The Editorial Board, as hereinafter defined, shall be responsible to the Medical Society Executive for the publication of the Journal on Schedule Time, for the contents of each issue.

(3) The Editorial Board shall consist of the following students in the Faculty of Medicine:

(a) An Editor-in-Chief, who shall be appointed as set forth in Article XVI, Section (d).

(b) Three Associate Editors, who shall be members of the Sixth Year, Fourth Year and Ladies' Medical Society respectively, all of whom shall be appointed by the Editor-in-Chief.

(c) An Assistant Editor, who shall be appointed as set forth in Article XVI, Section (f).

(a), (b), (c) to be approved by the Medical Society Executive.

(4) The Editor-in-Chief, assisted by his Associate Editors, shall be responsible for the organization of the editorial staff as hereinafter stipulated, for the assembling of material for each issue, and for the proof-reading of same. At the close of his term of office he shall call a meeting of the Editorial staff for the purpose of nominating the Editorial Board for the ensuing year, such nominations to be handed to the President of the Medical Society.

(5) The Editorial Staff shall consist of the editorial board and six distributing representatives appointed by the editorial board from each year respectively. At the discretion of the Editorial Board a Sporting Editor may be appointed to the Editorial Staff by the Editor-in-Chief. It shall be the duty of the Editorial Staff to carry out any work which may be allotted by the Editor-in-Chief. It shall be the duty of the Year representatives to obtain yearly subscriptions to the Journal, and to distribute each issue to subscribers in their respective Years. Each representative shall be paid by cheque a commission equal to ten per cent. (10%) of the total value of such subscriptions obtained, such cheques to be signed by both the Editor and Managing Editor and paid on or before December 1.

(6) The Managing Editor shall, with the approval of the Editorial Board, let the contract for the printing of the Journal. He shall control the sale of advertising space in the Journal, the rates to be set by the Editorial Board, and shall be entitled to a commission of twenty per cent. (20%) of the monies collected for such advertising. Such commission to be paid by cheque over the names of the Managing Editor and Editor-in-Chief. He shall be responsible for the distribution and sale of the Journal by the Year representatives and for the mailing of each issue to all subscribers other than undergraduates in the Faculty of Medicine of the University of Toronto. He shall be entitled to a commission of five per cent. (5%) of the total value of all yearly subscriptions sold, such commission to be paid by cheque over the signatures of the Managing Editor and the Editor-in-Chief. He shall be responsible for the maintenance of an up-to-date list of Journal subscribers. He may solicit subscriptions anywhere, but

any form of circularization or advertising in the name of the Journal, calculated to draw subscriptions, must have the approval of the Medical Society Executive before it may be used. The Managing Editor may appoint an assistant to aid him in the discharge of his duties. A member of the Editorial Board shall act as Secretary at all meetings of the Editorial Staff and shall keep a full record of the proceedings of such meetings to be handed to the Medical Society Executive at the close of the term.

(7) All meetings of the Editorial Staff shall be presided over by the Editor-in-Chief, or, in his absence, the Assistant Editor and the Secretary shall act in that capacity. The usual rules of Parliamentary procedure shall govern such meetings. Seven members of the Editorial Staff shall constitute a quorum, and the Chairman shall vote only in case of a tie. The Editorial Staff shall meet at the discretion of the Editor, and all business relating to the Journal shall be conducted at such meetings. All correspondence and funds received in the name of the Journal shall be acknowledged, and payment of all funds in the name of the Journal shall be made only after a motion authorizing the same has been passed at a regular meeting of the staff. A financial statement complete to date shall be prepared once a trimester by the Managing Editor; and this statement shall be adopted and presented by the Editor at the next following meeting of the Medical Society Executive. The final meeting of the Editorial Staff shall be held not later than May 1st. At this meeting the Managing Editor shall present a final financial statement of the current year. After adoption he shall present this statement, together with all vouchers for payment of monies, funds on hand, and the record of proceedings at all meetings to the Medical Society Executive, as a final report of the Journal for the current year.

(8) The Editorial Board must elect an advisor from members of the Faculty.

#### 4. Finances.

(1) The price per copy and yearly subscription rate of the Journal shall be decided by the Editorial Staff and approved by the Medical Society Executive.

(2) All funds payable to the Journal shall be deposited in a bank under the name of the University of Toronto Medical Journal, by the Managing Editor.

(3) The Managing Editor shall act as Treasurer and pay all accounts by cheque when so ordered by a motion passed at a regular meeting of the staff, and not otherwise. All cheques shall be countersigned by the Editor-in-Chief.

(4) The following commissions shall be paid by separate cheques when duly

authorized by a meeting of the staff:

- (a) 20% of all monies collected for advertising to the Managing Editor.
- (b) 5% of the total value of all year subscriptions to the Managing Editor.
- (c) 10% of the total value of subscriptions collected in each year to the respective Year distributing representatives.

(5) No other commissions, salaries or honoraria shall be paid to any member of the staff by the staff unless so authorized by an amendment to the Constitution of the Medical Society.

(6) Complimentary subscriptions to the Journal for the current year shall be given to each member of the Editorial Staff.

(7) Two complimentary copies of a current number may be given to each contributor and advertiser.

(8) As stated in Article XIX Sec. 3 (7), the Editor shall present an up-to-date financial statement each trimester to the Medical Society Executive and a final financial statement, together with vouchers and funds on hand shall be turned over to the Medical Society Executive not later than May 5th of the current year.

(9) The proceeds from the Medical Journal for the current year shall be turned over to the Medical Society Executive and shall be distributed as follows:

- (a) 25% to the Medical Society treasury.
- (b) 35% as an honorarium to the Editor-in-Chief.
- (c) 7½% as an honorarium to each Associate Editor. (3).
- (d) 7½% as an honorarium to the Assistant Editor.
- (e) 10% as an honorarium to the Business Manager.

5. The Medical Society shall be responsible for debts and liabilities incurred by the Medical Journal only if the Editorial Staff follows the Constitution of the Medical Journal as herein set forth.

6. The Editor-in-Chief and the Managing Editor shall be held jointly responsible to the Medical Society Executive for the publication, contents and financial outcome of the Journal. Failure on the part of either to comply with the regulations set forth in any section of Article XIX shall render either or the above parties liable to dismissal by the Executive.

## ARTICLE XX—EXECUTIVE AWARD.

### 1. Name.

The name of the award shall be the Executive Service Award of the University of Toronto Medical Society.

### 2. Description.

The Award shall be from a design submitted by Ryrie-Birks.

It shall be of 10 K. gold and in the form of a key to be worn on the watch chain. On the key will be a skull and cross-bones raised from the surface on a background of black enamel. The black enamel shall be surrounded by a border of yellow gold. On the back of the key shall be inscribed the office or offices held on the Medical Society Executive by the one receiving the Award.

### 3. Rule of Awarding.

(a) All members of the Medical Society who have served on the Medical Society Executive for one year or more in any of the various offices, except that of Musical Director or Business Manager of the Medical Journal, shall be eligible for the Award.

(b) The Musical Director and the Business Manager of the Medical Journal are not eligible for the Award.

(c) No one shall be eligible for more than one Award.

(d) The Award shall not be presented to those eligible for it until they have entered their fourth year.

(e) The Awards will be presented to those men who are eligible and in their 4th year at the last meeting of the Medical Society Executive for that year by the Assistant Secretary-Treasurer.

### 4. Management.

(a) It shall be the duty of the Assistant Secretary-Treasurer to enter into a book the names of all those eligible for the Award from the year 1929-30.

(b) To keep the list of names up-to-date and to present each year to the Medical Society Executive the names of those men to receive the Award that year.

(c) To place an order for the Awards not later than March 1st.

(d) To obtain the signature of each man after he has received the Award.

## TO THE SIXTH YEAR.

Refusing to wax sentimental and without presuming to congratulate or commiserate with the students of the sixth year on the rapidly approaching end of the course, may we only say this that we hope the Final Examiners will concur with the sentiments expressed by Mr. I. H. Cameron, Professor Emeritus of Surgery, in a lecture to the class of '27,—“... And having brought you thus to the birth, shall the Faculty not deliver?”

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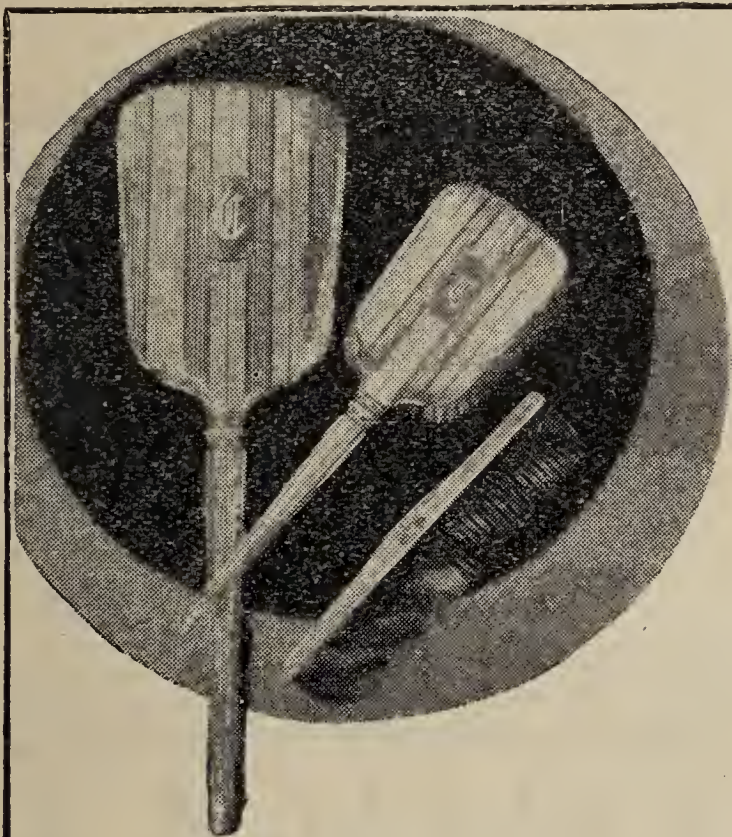
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